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JULY 4, 1955

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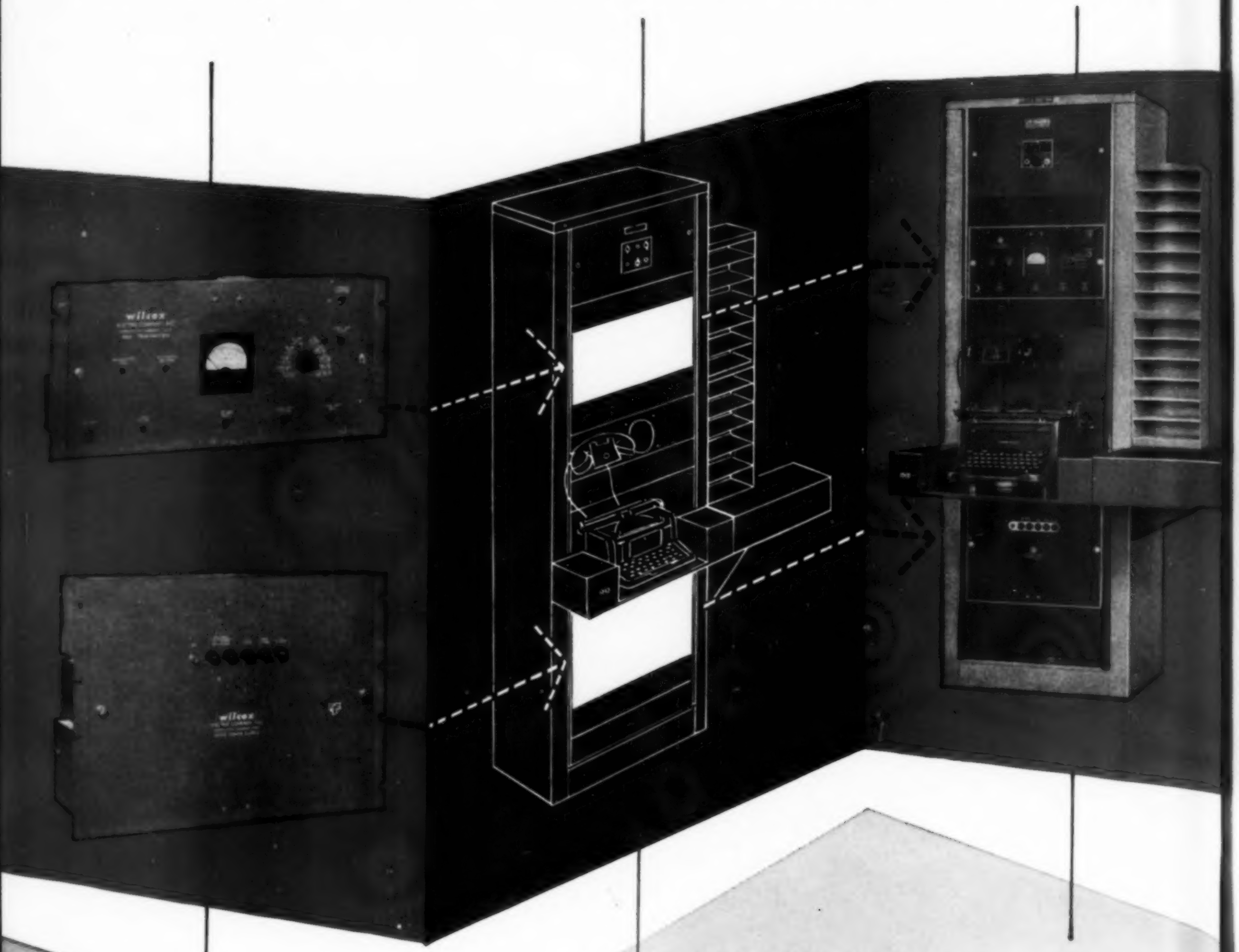

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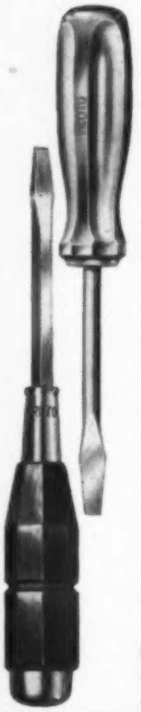

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MEMO

From: Engineering & Production

To: Sales Department

Subject: Size 8 and 22 Synchros

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Industry News Digest

Boeing Due for More Tanker Orders

Speed-up of production of the B-52, F-101 and F-104 is considered in industry circles as a sure sign Boeing will get more orders for its KC-135 jet tanker.

Air Force originally had planned approximately one KC-135 for each eight-jet Boeing B-52, but when the latter program was speeded there were no additional orders for the tanker. But speedup of the long-range bomber and fighter programs makes orders for additional KC-135s almost inevitable, since tankers also will be needed for aerial refueling of the new stable of supersonic fighters.

With exception of Lockheed's design study contract for the KCX, there is no other USAF jet tanker.

Present orders for the KC-135 total fewer than 300, while programmed B-52s now total close to 500 and combined orders for the McDonnell F-101 and Lockheed F-104 probably will exceed that figure.

Court Reverses CAB On Nonsked's Name

A Civil Aeronautics Board order which denied North American Airlines' application to engage in air transportation under that name, and to cease and desist from using the name or any combination of the word "American," was reversed June 23 by the U. S. Circuit Court of Appeals, District of Columbia.

Thus the court overturned a 4-1 decision of the CAB in which Vice-Chairman Adams had been the only dissenter. American Airlines contended that "North American" infringed upon the established name of American and that this constituted unfair competition within the meaning of Section 411 of the Civil Aeronautics Act.

In a unanimous decision, the Court of Appeals declared that CAB had offered "no evidence whatsoever" in support of its ruling and that there was no evidence that North American "palmed itself off as American."

Spelling out the reasons for its decision, the Court declared:

"Nor is there evidence that North American flew a single passenger who paid its lower rate in a thought that he contracted for anything but North American's non-scheduled transportation, or that American was harmed otherwise than by the competition afforded by any irregular carrier. In short, the public may have benefited, so far as the record shows, and in any event, there is no demonstration that North American affirmatively acted in violation of a statute within the jurisdiction of the Board."

CAL Confirms Option To Buy 15 Viscounts

Continental Air Lines president Robert F. Six has confirmed earlier reports (American Aviation, June 20) that his airline holds a 120-day option to buy 15 Vickers Viscount 800 turboprop transports.

Final CAL decision to buy, Six said, has not been made pending receipt of further data from Vickers and Rolls-Royce on performance of the aircraft with more advanced Dart engines.

Use of the originally proposed Dart R.Da.6 engine has been ruled out completely by Continental as not suitable for operation in high temperatures and from high altitude airports. If CAL exercises its option, Six indicated, it would like to power the Viscount initially with R.Da.7 rated at 1,950 ehp and later with "phase two" R.Da.7 engines rated at 2,100 ehp. The R.Da.6 rating is 1,750 ehp.

Hispano-Suiza Guns On U. S. Military Planes

Hispano-Suiza, French aircraft firm, displayed a list of U. S. military aircraft fitted with its 20-mm. cannon during the International Aircraft Exposition at Geneva, Switzerland, last week.

Also displayed publicly were details of HS guns fitted on other military aircraft.

The U. S. list showed the following planes and total guns for each:

Boeing B-47, two; Chance Vought AU-1, four, and F7U, six; Convair B-36, 16; Douglas A2D-1, six; A-3D-1, two, AD-4, two, and F-3D, four; Grumman AF-2, two, and the F9F and F9F-6, four; Lockheed P2V-2, eight, and P2V-5, four; McDonnell F2H-2 and F3H, four; North American F-86K and FJ-2B, four, and AJ-2D, two; and Northrop F-89D, six.

Gen. Chidlaw Joins Thompson Products

Gen. Benjamin W. Chidlaw, who retired May 31 as head of the Air Defense Command and Continental Air Defense Command, has joined Thompson Products, Inc., as vice president and consultant on aircraft.

MORE POWERFUL DEMON all-weather, high-performance fighter is now being delivered to Navy by McDonnell Aircraft Corp. The F3H-2N is powered by a 10,000-lb.-thrust Allison J71 with afterburner. Earlier Demons are powered by 7,500-lb.-thrust Westinghouse J40. F3H-2N carries Navy's new gray and white color scheme.

TWO FIBERGLAS AIRPLANES, manufactured by Taylorcraft of Conway, Pa., recently were ferried to Asuncion, Paraguay, in the company's first South American delivery. The planes were purchased by Aero Carga. The firm will use them for hauling cargo and passengers. Shown just before the ferry flight took off, is B. J. Mauro, Taylorcraft president (Left) looking on while export manager Howard Barnhouse delivers documents to Don Swenson, assistant export manager, who was in charge of the flight. The all-Fiberglas plane is of conventional Taylorcraft design with four-passenger capacity. It is powered by a 225-hp. Continental engine and cruises at 150 mph.

ADMA Accused of Failure to Promote Civilian Flying During Postwar Era

Aviation manufacturers and distributors were criticized for their failure to promote civilian flying activities adequately since the end of World War II by Dwight P. Joyce, chairman and president of the Glidden Company, at the mid-summer meeting of the Aviation Distributors and Manufacturers Association in Brainerd, Minn.

Joyce charged that some manufacturers and distributors have become so engrossed in the pursuit of profits that they have lost sight of what he described as "the fundamental activity that makes their business possible—the promotion of civilian flying in all its aspects."

• **Only in crop-dusting** activities and airline operations has there been sound progress by civilian flying during the past 10 years, Joyce said. He cited in support of his contention "many abandoned airports, much reduced activity at others, and numerous private pilots who have lost their interest in flying and have quit."

The airlines have not actively encouraged other forms of civilian aviation, particularly private flying, Joyce declared, adding that they "indirectly or short-sightedly tend to discourage private flying."

He asserted that there is really no competition between the two forms of transportation, but that, "on the contrary, they are complementary."

Joyce suggested that the ADMA and the Air Transport Association study the promotion of pleasure flying on a widescale basis and, after carefully analyzing the facts, work out "a constructive plan of action throughout the whole industry to bring about the desired results."

• **Tom Fernley, Jr.,** ADMA executive director, went to bat for the distributors, urging the manufacturers to "survey the problems of their distributors to see that they are adequately compensated for services rendered." Fernley cited a drop in net profit from 6.31% in 1951 before taxes to 3.77% in 1954, with a net profit, after taxes, of 3.96% and 2.43%, respectively, for those years.

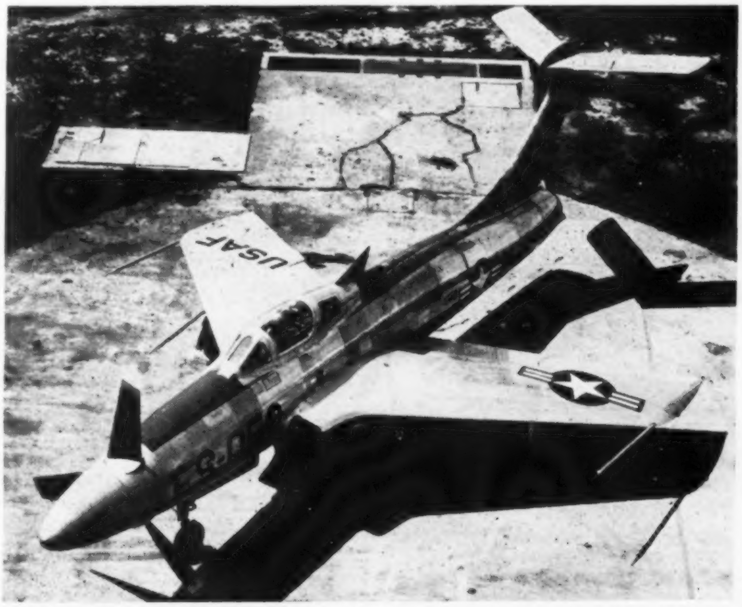
"A considerable amount of this reduction is due to the fact that gross margin for 1954 is the lowest since we began to compiled figures in 1946," Fernley said. "The average is 24.56%, a reduction of over one percent from the 1953 figure. On the other hand, our members are operating on an efficient basis with their overhead expenses in 1954 being 20.79%—the second lowest figure in the last nine years."

Italy's Fiat Gets F-86D IRAN Contract

Fiat, the Turin, Italy, aircraft firm, has been awarded a USAFE F-86D repair contract (IRAN) involving seven planes a month starting August 1.

Total number of planes in the program is reported to be 79, with an option of 35 additional. Total manhours per plane probably will run about 3,000.

Meanwhile, Fiat's second North American-licensed F-86K Sabre jet flew late last month and the third was scheduled to fly last week-end.



READY FOR FLIGHT TESTS at Edwards AFB is the Republic XF-84H, which was designed as a test bed for several newly developed turboprop engines, including the 7,500-hp Allison T54. The XF-84H, which at one time was to be called the XF-106, is the first experimental craft to use jet thrust augmentation in conjunction with a turboprop airplane. The propeller seen above was built by Aeroproducts but Curtiss and Hamilton-Standard props also will be tested on the plane.

Kawneer "package" service provides economy in Cessna Cockpit enclosure

Kawneer provides quality, economy and delivery again! Last Fall Kawneer started the Cessna T-37 side-by-side cockpit enclosure project and delivered the first unit this Spring. This "on schedule" procedure was possible because Kawneer has formed an integrated "package" of engineering, design and production in the cockpit enclosure field.

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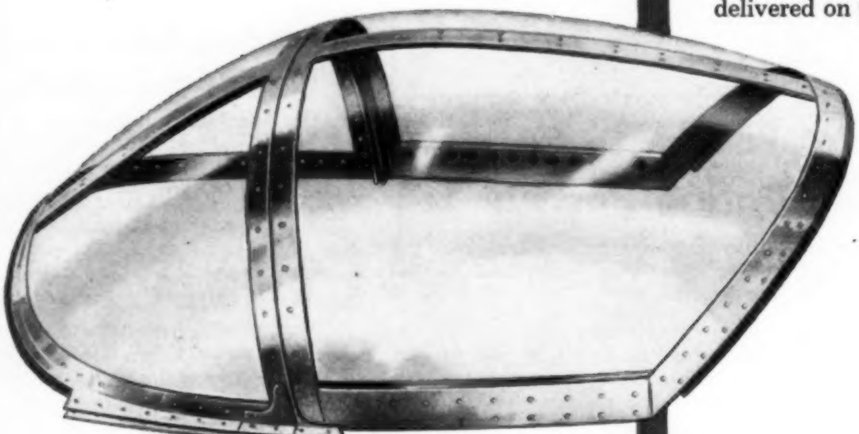

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Personal View

By WAYNE W. PARRISH

The Nuclear Aircraft Stall

THE LEAD article in this issue of AMERICAN AVIATION is a shocker of considerable magnitude. Mr. David S. Teeple, who is in a position to know a great deal about the entire atomic energy program from the start, poses the very grave question that there has been laxity and negligence in the nuclear-propelled aircraft program.

It was only last year that the American Public was told some of the story behind the hold-up of the development of the hydrogen bomb.

Now it appears that nuclear-propelled aircraft have been delayed in somewhat similar manner, and that only now is there a sign of forward movement in their development.

A vital key to the mystery is the long-shelved Lexington Report. It was never made public. Yet there is every indication that this report strongly advocated early application of nuclear power to aircraft.

On February 2, 1949, Carroll L. Wilson, then general manager of the Atomic Energy Commission, testified before the Joint Committee on Atomic Energy as follows:

"An important part of that which we have had under study for some time is the reactor for aircraft. We asked the Massachusetts Institute of Technology last summer to put together a group of people, bring them together from the various industrial laboratories and Commission establishments to make a very complete review of the technical feasibility of developing a reactor to propel an aircraft.

"The product of this study, which is called the Lexington Report, was submitted two or three months ago, has been carefully studied by the Commission, its General Advisory Committee, the Air Force, the Bureau of Aeronautics, the NACA. We have been discussing with them the issue of this report with the removal of information which should not be included in it from a security standpoint, that this be issued in the near future to provide basic information growing out of this study.

"We have looked at this very carefully, and it is our judgment and I believe this view is shared by the Air Force, and the Bureau of Aeronautics, and NACA that it would be useful in getting on with this program to have a declassified Lexington Report summary made available for public discussion."

More than six years have passed. Not only was the Lexington Report shelved, but according to Mr. Teeple, it was virtually buried. Like the hydrogen bomb, it was not considered "right." But, as Mr. Teeple points out with considerable grimness, if the Russians have been so successful in acquiring other atomic secrets, "There is no reason to believe that they neglected to discover the contents of the Lexington Report."

Isn't it time that questions were asked in high places about the shelving of the nuclear-propelled aircraft program? Isn't it time to ask why a declassified version of the Lexington Report was never made public? And isn't it time to inquire why, if the "scientific breakthrough" has now been achieved, more funds are not going into the aircraft program?

Who are these people who have stifled the program? Are they the same ones who held up the H-bomb?

It's a shocker any way you look at it.

Drinking on Airplanes

Serving alcoholic beverages on domestic airlines is relatively new and before it gets out of control through competitive and other reasons the airlines might take a good look at a self-disciplinary code.

European airlines began serving beverages from the start without incident. In fact the sale of beverages has been an important item of revenue. Trans-Atlantic airlines began beverage service shortly after they got underway after the war. Now the practice is fairly widespread in the U. S. on long-haul through flights.

There is nothing wrong with a well-ordered beverage service and we don't hold with the moral issues raised recently by an Eastern Air Lines pilot in a Methodist Board of Temperance publication when he used exaggerated and isolated illustrations of incidents occurring from the use of alcoholic beverages by passengers.

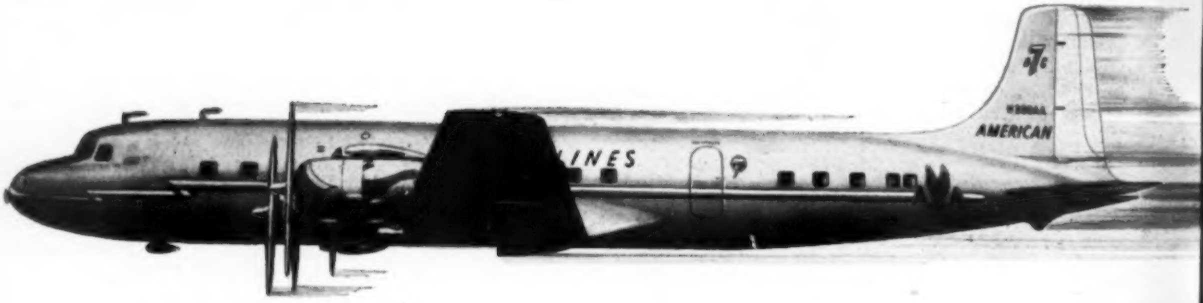
But the airlines do have a responsibility to place limits on the amount of drinking. We've heard a few instances lately of excessive imbibing and these, we believe, are the fault of the airlines in continuing to serve doubles of hard liquor to a few passengers who set up the demand. Serving of drinks should take place before meals, the latter providing a good shut-off control point.

A majority of long-haul passengers prefer a drink or two, but no one should discount the large number of people who disapprove of drinking on moral grounds or who don't drink out of personal choice. There is nothing worse than a noisy ill-bred souse, no matter whether it's in a nightclub or a restaurant or on a public conveyance. The airline standard of public service has been the highest of any carrier in history. It should be kept that way. Let's not risk a drastic ban on serving beverages by letting a few characters wheedle extra stiff drinks from the carriers to the annoyance of everybody else.

Good Idea

Bob Ball of the Detroit News, who has written aviation news for several decades, has come up with a worthy idea in which we thoroughly concur. A $4-million nuclear powerplant laboratory is being built in Cleveland for NACA. Ball thinks this new plant should be dedicated to and named for Charles E. Taylor, the mechanic for Orville and Wilbur Wright, now retired in California. Taylor's mechanical contributions to the first powered flight are well established. The Cleveland laboratory would be a fitting recognition for the role he played in the achievement of powered flight.

Sinclair helps AA bite off 3,000 Miles between meals!



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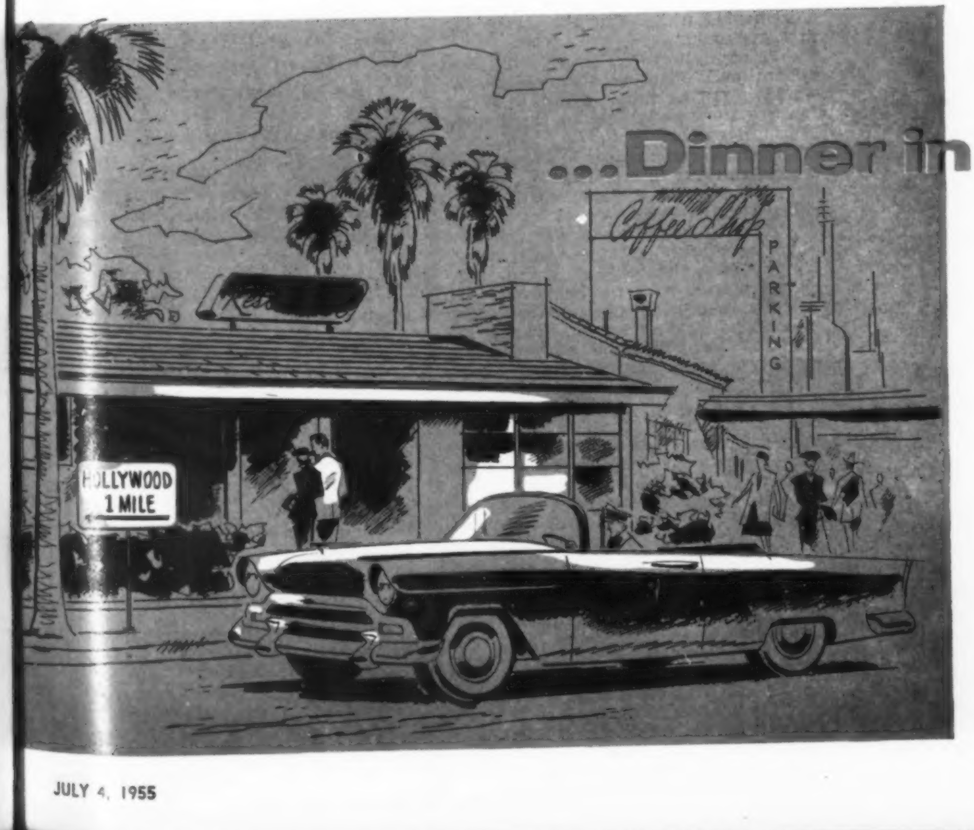
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Letters

Triple Dilemma

To the Editor:

The controversy **TACAN-VOR/DME** has been presented by the editorial of AMERICAN AVIATION (May 9, '55) as a mere dilemma, making necessary a choice between the two rival systems.

A deeper analysis of the facts must show that there does not exist a single dilemma, but at least three, and that it will be of the highest interest to solve them altogether.

First dilemma—A system suitable only for civilian planes ought to give place to a system fitted for both civilian and military uses, if there is one. This new system must be able to give the position of the planes both to their crews and to the ground control services.

Second dilemma—A system suitable only for short-range navigation ought to give place to a system fitted for both short-range and long-range navigation, if there is one. The increasing speed of the planes, and the use of jet planes, make it more and more necessary to get control of the aerial circulation, civilian or military, at distances greater than the range of UHF and radar. The ideal will be to keep this control all along the route of a plane, even if this route crosses the Atlantic Ocean, for instance.

Third dilemma—A system suitable only for high flying planes ought to give place to a system fitted for both stratospheric machines and for lowflying ones, as private planes and helicopters.

So the dilemma is a triple one:

- War and peace.
- Short and long ranges.
- High and low altitudes.

It is certain that the **VOR/DME** does not meet any of these three requirements, while TACAN meets the first one only.

Before throwing away the first system and adopting the second one, would it not be more logical to search for a system answering to three questions altogether?

Such a system does not belong to an imaginative future. It exists in fact under the form of the French system called **RADIO-WEB.**

This system, based on physical phenomena of moving interference fringes, gives the position of any number of planes, both to their crews and to the ground control operators. Their indications are automatic, instantaneous, and non-ambiguous whatever may be the size of the controlled area. It may use any carrier wavelength: very long waves for long range navigation; medium waves for short range at any altitude; very short and centimetric waves for approach or guidance of planes and missiles.

On official order of the French Government, a demonstrating apparatus is now built and put in place over an area of 100 by 100 kilometers, near Paris.

A few months' experiment must show the value of the system and make it possible to judge whether it deserves to be developed on a worldwide basis.

If we add that its price, for ground and board materials, will be considerably lower than **VOR/DME** or **TACAN,** it may appear that the **RADIO-WEB** system must gain the attention of authorities in Europe and in the States.

/s/Lt. Colonel P. G. Gaudillere

General Manager of the Societe
Francaise des Telecommunications,
Paris, France

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July 4, 1955 - VOL. 19, No. 3

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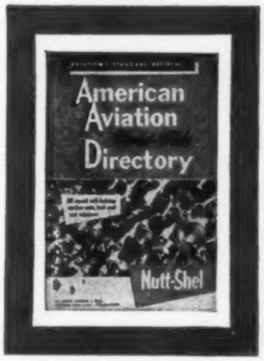

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This triumph of Esso research adds one more chapter to an already splendid record in the development of new products for civil and military aviation.

Esso

AVIATION PRODUCTS

AIRTRENDS

Washington, D. C., July 4, 1955.

ANNOUNCEMENT OF U. S. OFF-SHORE PROCUREMENT ORDERS for two French lightweight fighters—the Breguet Taon and the Dassault Mystere 26—is expected momentarily. Only European lightweight fighter currently sponsored by the U. S. is the Fiat G.91. Orders for the French planes would probably be for three of each.

THE PROTOTYPE HANDLEY PAGE HERALD four-engine "DC-3 replacement" is to be rolled out next month. It should have completed sufficient flight time to be shown at Farnborough in September. The second prototype will fly six months after the first. First production version of the high-wing transport is likely to be flying in mid-1957. Nine more aircraft should be completed by end of '57.

DEFENSE DEPARTMENT'S REVISED DIRECTIVE on jet engine development, signed June 23 by Secretary Charles E. Wilson, recognizes desirability of intelligent competition within industry. Engine producers who have studied it are said to be pleased. Important requirements of new policy follow:

(1) *Establishment of series of basic* engine thrust classes for each category of engines. Each class must be about 50% larger than next one.

(2) *Frequent evaluations* of development programs, allowing for timely revisions and re-direction of effort.

(3) *Maximum standardization* and inter-service use of new engine types, to bring about reduced costs.

PROSPECTS OF $250-MILLION AIRPORT AID PROGRAM appear bright despite opposition of Eisenhower Administration. Sen. A. S. (Mike) Monroney steered bill through friendly Senate without a single voice being raised in objection. Monroney bill authorizes four-year program of airport construction at annual rate of $63 million.

Only way to stimulate such a program, Monroney believes, is to assure that federal funds will be available on steady annual basis.

TAKEOFF NOISE LEVEL of present jet aircraft may be brought down to that of quiet piston engine planes of same weight by new noise suppression methods developed by Rolls-Royce Ltd.

At joint meeting of Institute of the Aeronautical Sciences and the Royal Aeronautical Society in Los Angeles recently, RR engineer F. B. Greatrex described tests in which Conway bypass engine was demonstrated to be nine decibels quieter than conventional Avon engine when operated at same thrust.

Greatrex also described new corrugated jet exhaust nozzle designs that have shown similar noise reductions without loss of thrust. One such device cut more than 12 db in the 300-600 cycle octave band where jet noise levels are highest.

WHITE HOUSE IS NOT EXPECTED to replace Charles Willis, who resigned recently as its "aviation specialist." Air matters will probably be handled in routine fashion through legal counsel, Jerry Morgan, or directly through Fred Seaton, deputy assistant to the president.

AIR-GROUND DATA LINK EQUIPMENT for feeding information between aircraft and ground-based air traffic control planning calculators reportedyl is ready for intergration with the military TACAN navaid system.

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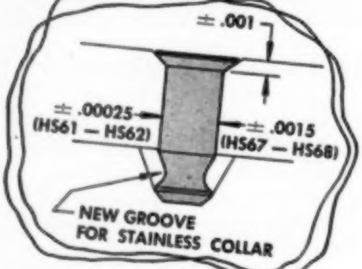

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Production Spotlight

• USAF has a requirement for a jet-powered utility plane. Competition winner will probably get orders from the Army, Navy and Marines as well.

• Air Defense Command's interceptor version of the McDonnell F-101 probably will use a more advanced engine than the two J57s in the F-101A. Choice will be made between P&W's J75 and Wright's J67.

• Military services are tightening up on publicizing design competitions. Tendency seems to be that aircraft companies considered not qualified to design a planned plane or missile need not know about the competition.

• A Navy contract for $200,000 for Beech Aircraft to develop and build target drones is still classified by the Pentagon even though announced by the Commerce Department. Beech's bid was far below the Navy's own estimates.

• U. S. Border Patrol and Canadian Mounties are expressing interest in the one-man helicopters under development by the Navy.

• Stroukoff Aircraft Corp. is just about ready to show off the results of its USAF "panabase" research contract. Technique will permit aircraft to land and take off from ground or water.

• Indications are that Pratt & Whitney T57 turboprop, slated to power the Douglas C-132 large cargo transport, may fly before the year-end. P&W is now modifying a Douglas C-124 Globemaster into a flying test bed for a nose-mounted T57. Project is under way behind a temporary two-story shelter at East Hartford.

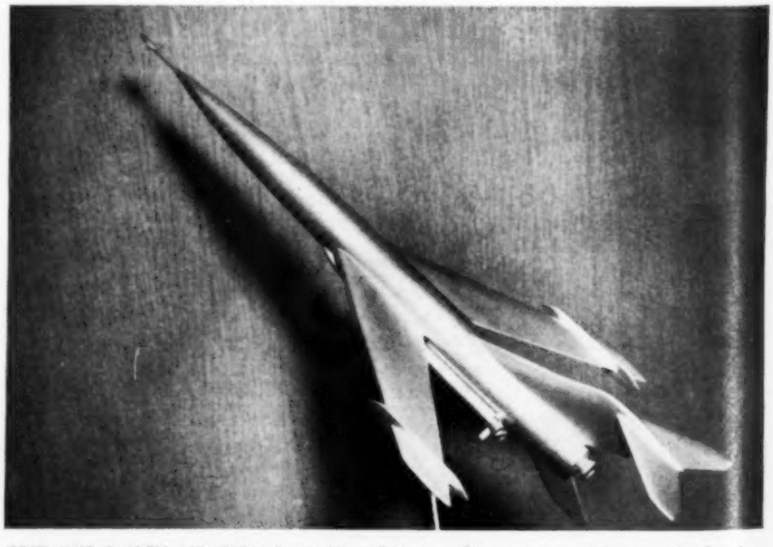
• Rolls-Royce RB-109 turboprop engine was first run on the test bench in May, and its competitor, the Bristol BE.25, is slated to run in September. Recent comparison of the two by Peter Masefield, BEA chief executive, showed these performance characteristics:

Engine	T/O Power	Cruise Power	Mass Air Flow
RB-109	4,400 ehp	2,390 ehp	41 lb./sec.
BE.25	5,050 ehp	4,300 ehp	86 lb./sec.

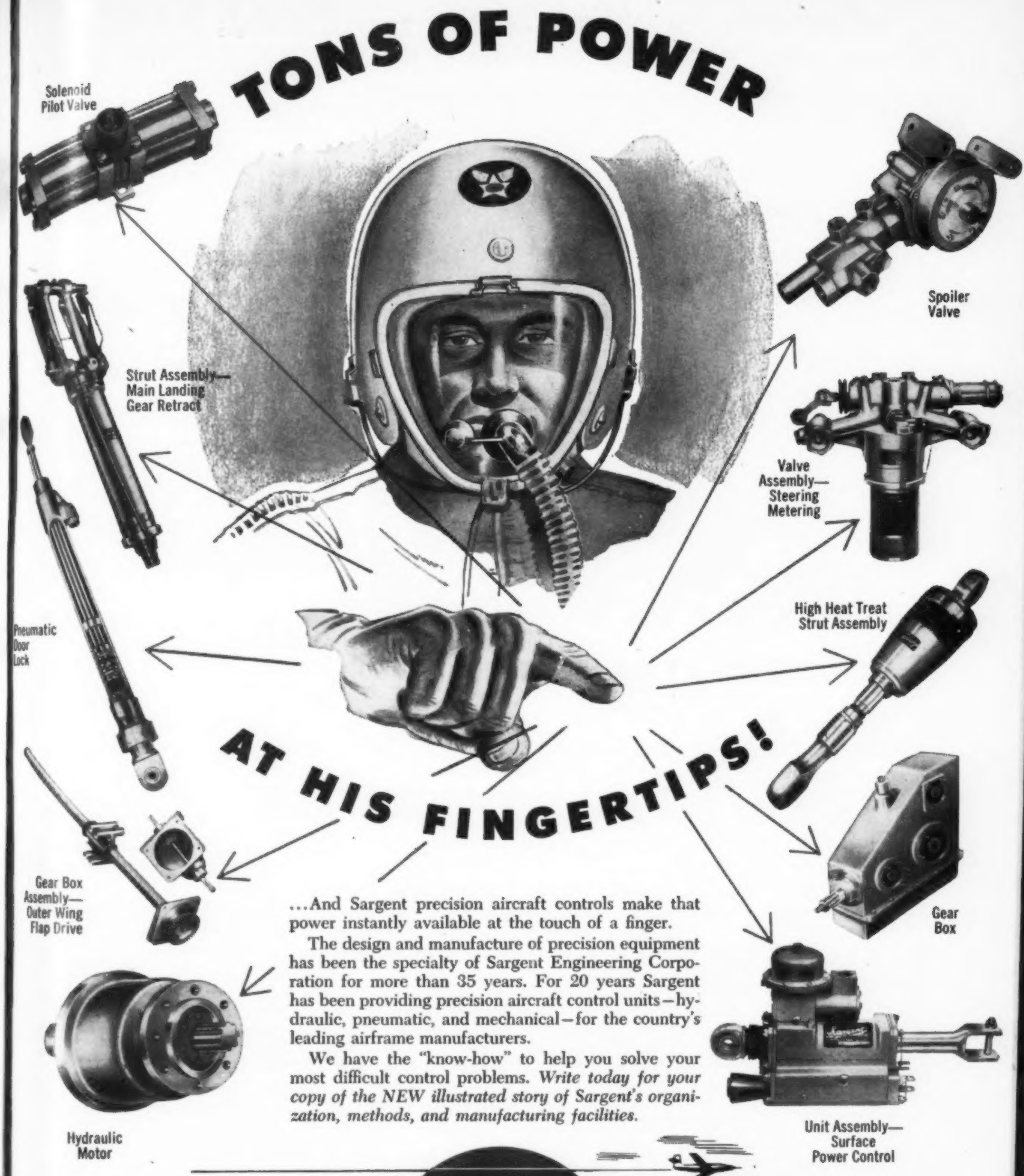
• A 2,750 ehp version of the Rolls-Royce Dart (Model RDa.8) is being projected for 1960 availability. Current timetable for the Dart RDa.7 Stage 1 (2,115 ehp) is early 1957 and Stage 2 (2,268 ehp) early 1959.

• A new automatized milling machine reduces milling time on North American Aviation F-100 Super Sabre wing panels 94%.

• New name for the company formed by the recent Sperry Corp. and Remington Rand Inc. merger is Sperry Rand Corp.



BRITAIN'S FAIREY AVIATION has indicated it is working on new guided missiles but has never given any details. This model, featuring four expendable booster rockets and what appears to be a ramjet in the tail, was on display at Fairey's exhibit during the Canadian Trade Fair. No identification of the model or its purpose was given.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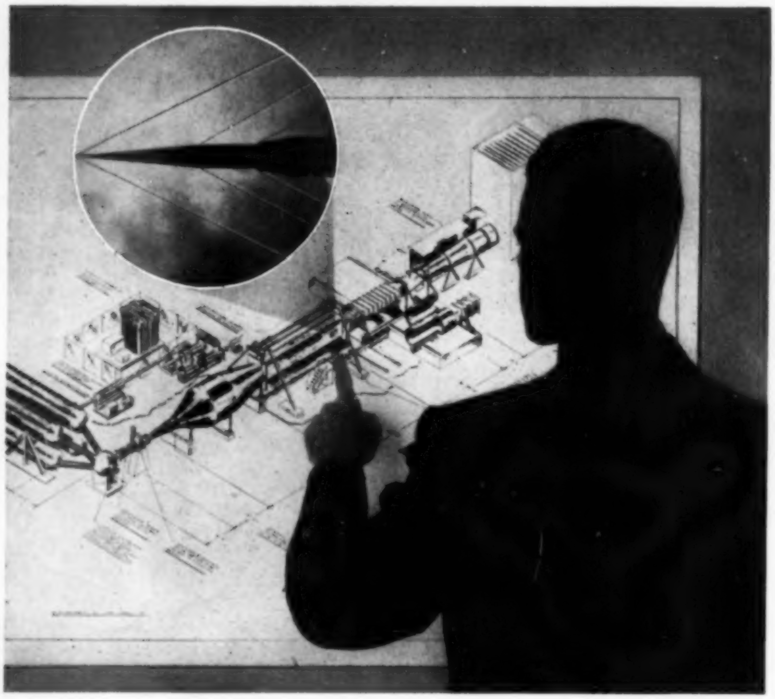

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When & Where

July 5-7—Office of Naval Research and Ryan Aeronautical Co. symposium on radar, radio, and sound wave propagation. Navy Electronics Lab., San Diego.

July 8-10—Second annual Pikes Peak National Air Convention, Colorado Springs, Colo.

July 12-13—Air Transportation Association reservations committee, Ambassador Hotel, Los Angeles.

Aug. 5-7—Third annual "Fly-In," Experimental Aircraft Association, Curtiss-Wright Airport, Milwaukee.

Aug. 8-10—Second National Turbine-Powered Air Transportation Meeting (sponsored by the Institute of the Aeronautical Sciences), Seattle.

Aug. 10-14—Air Force Assn. Convention and Airpower Panorama, San Francisco.

Aug. 15-20—National Flying Farmers' Assn. convention, East Lansing, Mich.

Aug. 19-21—Second annual "Fly-In," Antique Airplane Assn., Ottumwa, Ia.

Aug. 22-23—Symposium on Electronics & Automatic Production. Stanford Research Inst., San Francisco.

Aug. 24-26—1955 Ignition Conference sponsored by Scintilla Div., Bendix Aviation Corp., Sidney, N. Y.

Aug. 24-26—Western Electronic Show and Convention, San Francisco.

Aug. 25—Annual corporate meeting, West Coast Electronic Manufacturers Assn., San Francisco.

Sept. 3-5—National Aircraft Show, sponsored by Air Foundations, Philadelphia International Airport.

Sept. 8—Airwork engine forum, sponsored by Pratt & Whitney and Bendix, Millville, N. J.

Sept. 15—Airwork engine forum, sponsored by Pratt & Whitney and Bendix, Miami, Fla.

Sept. 25-27—International Northwest Aviation Council's 19th annual conference, Yakima, Wash.

Sept. 26-27—Automation Symposium, sponsored by Radio-Electronics-Television-Manufacturer's Assoc., University of Pennsylvania, Philadelphia.

Oct. 4-6—11th Annual Spark Plug & Ignition Conference sponsored by Champion Spark Plug Co., Toledo.

Oct. 5-7—National Airports Conference (sponsored by American Association of Airport Executives and the University of Oklahoma, Norman, Okla.

Oct. 5-7—National Business Aircraft Association annual meeting and forum, Sheraton-Cadillac Hotel, Detroit.

Oct. 11-13—Air Transportation Association engineering and maintenance conference, Dallas.

Oct. 11-15—Nat'l Assn. of State Aviation Officials annual meeting, Dallas.

Oct. 11-15—Society of Automotive Engineers aeronautic meeting, aircraft production forum and engineers forum, Los Angeles.

Oct. 31-Nov. 1—East Coast Conference on Aeronautical and Navigational Electronics, sponsored by I.R.E., Baltimore, Md.

INTERNATIONAL

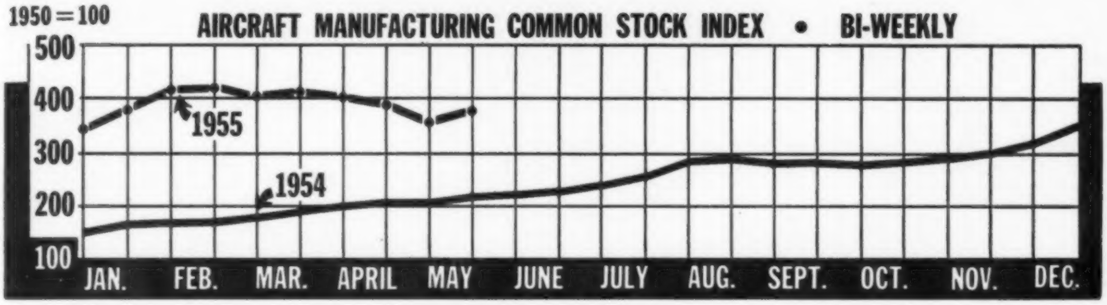
July 27-29—Helicopter Congress, Rotterdam Helicopter Syndicate, Rotterdam.

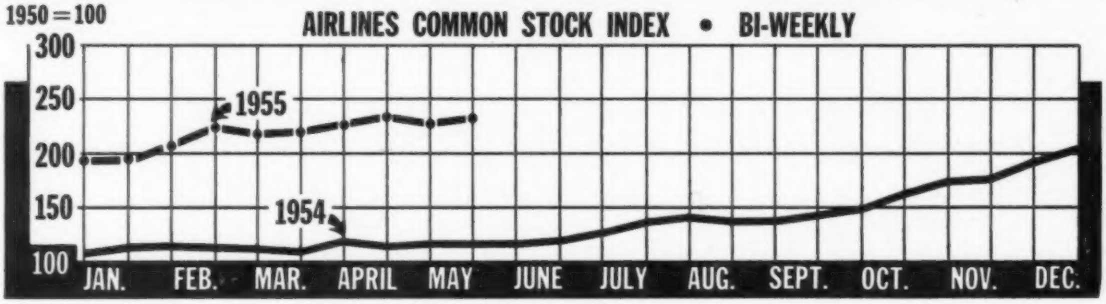
Aug. 30—International Civil Aviation Organization air navigation conference, Montreal.

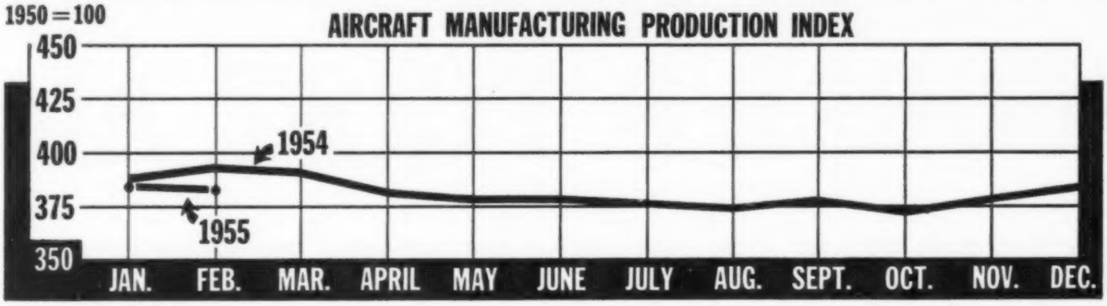
Sept. 6—International Civil Aviation Organization conference on draft protocol to amend Warsaw convention, The Hague.

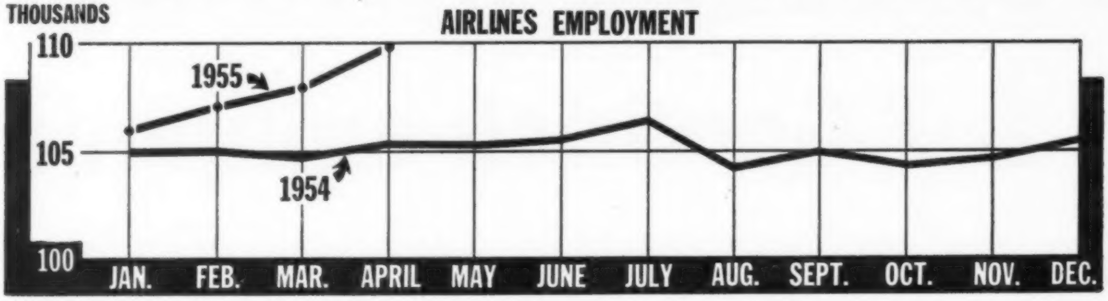
Sept. 6-11—Society of British Aircraft Constructors Aircraft Show & Flying Display, Farnborough, England.

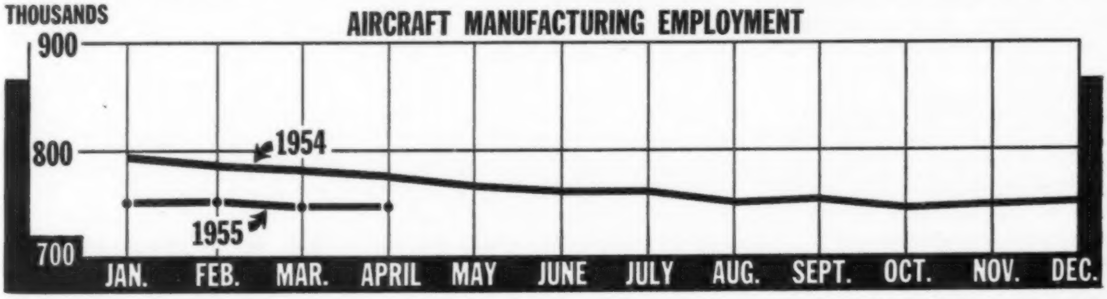
Pulse of the Industry











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American Aviation

VOL. 19, NO. 3

Was Atomic Aircraft Program Torpedoed?

- **Former AEC official says there may have been laxity and negligence in development of nuclear-powered planes, that the submarine Nautilus probably got the go-ahead because its reactor could be used commercially.**
- **As a consequence, he adds, the U. S. may be as much as six years behind Russia.**
- **An extensive study of the feasibility of such aircraft was made in 1949, but the results were never announced publicly. What, he asks, did the study reveal?**

By DAVID S. TEEPLE

(Former assistant to the chairman of the Atomic Energy Commission)

Lewis L. Strauss, chairman of the Atomic Energy Commission, made a comment last month that may contain an acknowledgment of laxity and negligence in the nuclear-propelled aircraft program far surpassing that surrounding development of the hydrogen bomb.

Testifying before the House Subcommittee on Public Works Appropriations, he said: "We have been greatly encouraged by developments during the past year in the aircraft nuclear propulsion program. Experimental results warrant a sharp intensification and expansion of these efforts."

Apparently, if one can interpolate Mr. Strauss' comment, there has been a scientific "breakthrough" that now makes the goal of nuclear-powered aircraft seem much more attractive than it used to be.

The nuclear-propelled aircraft program has been a stepchild of the entire atomic energy program for years because it did not fit into the thinking of some scientists that nuclear energy should be confined to peaceful uses. The consequences of this thinking could well be that Russia is as much as five or six years ahead of us in this field.

• **It is a matter of history** that scientific "breakthroughs" occur in direct proportion to the amount of time, money and manpower expended upon a particular study. We know that as a result of the expenditure of more than $2 billion and arduous work of thousands of scientists and engineers, we compressed into a few brief years atomic research and development that may well have required a century under other circumstances.

We might have done the same with the nuclear-powered aircraft if it had been pushed as vigorously as the atomic-powered submarine, Nautilus.

We need an atomic-powered submarine like we need a hole in the head. But it happened to fit in with the thinking of the scientists, whereas the nuclear-propelled aircraft did not.

Serious though the charge may be, *it nevertheless is the opinion of many that this nation built a nuclear-propelled submarine because the reactor unit contained in that vessel was a training ground for the prototypes of industrial power reactors* with which the scientific leaders of our country were enamored.

Using the sacred obligation of national defense, it was possible to obtain unlimited quantities of money to experiment with reactors for this naval vessel and at the same time gather information to be used in constructing reactors for economic atomic power.

• **Nuclear aircraft** offered no such opportunity. Whereas the reactor for the submarine was rather large and could be shielded with conventional materials, the construction of a reactor to be borne in flight encompassed entirely different problems of weight and shielding.

There never has been reason to believe that a successful nuclear reactor for aircraft would materially contribute to the development of industrial atomic power. *This was to be part of a weapons system.* From the beginning it was so understood by those who were associated with the project.

The attitude of American scientists and the administrative hierarchy of the Atomic Energy Commission in its early days seemed opposed to the production of weapons as against the exploitation of the benign uses of atomic energy for the betterment of mankind.

But while the nuclear-powered aircraft program was ignored or merely allowed to exist, the submarine reactor was pushed vigorously and the Nautilus ultimately produced.

Yet, if the purpose of the Nautilus was to protect us against the Soviet threat, it would take a mental giant to justify the money and scientific manpower expended on that project. Obviously, the Soviets have a very small merchant marine and depend for their economic existence on continental trade.

After the first atomic bomb was dropped in 1945, it became apparent to all that the science of warfare had been revolutionized. Now, for the first time, with atomic weapons capable of the destruction of large cities at a single blow, it was possible to destroy an enemy overnight.

Now that we could produce atomic bombs, *the necessary corollary was to devise a system of deliverability that would insure placing them over the target.*

Having controlled a new and powerful source of energy, what was more obvious than that we should attempt to harness that energy in the

Nuclear Reactor Budget Estimates

Category	Actual, fiscal year 1954	Estimate, fiscal year 1955	Estimate, fiscal year 1956
Civilian power reactor dvpt.	$18,974,600	$25,804,000	$35,430,000
Army power reactors	—	678,000	2,100,000
Naval propulsion reactor program	26,498,081	28,270,000	34,368,000
Aircraft propulsion reactor program	14,572,118	21,575,000	37,900,000
Special classified projects	7,607,638	6,150,000	7,200,000
Advanced engineering and development	12,104,427	12,874,000	11,950,000
Operation of service facilities	7,846,210	5,735,000	5,734,000
Totals	$87,603,074*	$101,095,000*	$134,582,000

** Includes, for comparability: $1.3 million funded by Navy for 1954; funds budgeted under programs for classified projects—$1.45 million in 1954 and $3.58 million in 1955.*

Source: Hearings before Senate Subcommittee on Public Works Appropriations for 1956.

development of a nuclear-propelled aircraft?

The only potential enemy of this country in 1945 was the Soviet Union, a tremendous land mass that elementary students of military tactics recognized could only be successfully attacked from the air.

The Lexington Report

Upon the urging of the Joint Congressional Committee on Atomic Energy, a scientific group was established by the Atomic Energy Commission called the Lexington Group of M.I.T., whose purpose it was to survey the feasibility of the development of a nuclear-propelled aircraft. This group conducted an intensive survey and submitted a report in 1949. **The contents of this report have never been revealed to the American people.**

Meanwhile, the Nuclear Energy Propulsion Aircraft program (NEPA), as it was known under the original Manhattan Engineer District, and the Aircraft Nuclear Propulsion program (ANP), as it is called under the AEC, has been a stepchild and has received very limited quantities of money, and extremely poor facilities.

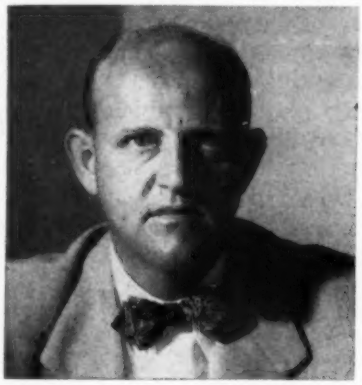
• **In fact,** from the very beginning, there was what amounted to a blacklist by the scientific fraternity in regard to the NEPA program. Promising young physicists and engineers were told in effect that if they wished to further their careers, they should avoid this project like the plague.

Consequently, through the years, only those sincerely dedicated to the belief that America's security was at stake have remained on the project. Despite the odds, they have done an astounding job. However, theirs has been an experience of bitter frustration and heartbreak.

Obviously, the American people can never evaluate the nuclear aircraft situation unless they know what the Lexington Group recommended in 1949.

Let us suppose that the Lexington Group stated that the nuclear propulsion of aircraft was not feasible. In that event, it would be difficult to justify even the relatively small amounts of money subsequently expended.

On the other hand, let us suppose that the Lexington Group advised that the nuclear propulsion of aircraft was scientifically feasible provided sufficient funds and effort were directed toward that end. This, then, would make the decision as to whether or not to pursue the project with greatest rapidity a momentous political decision not to be entrusted to an administrative agency.



Who is David Teeple?

He is former special assistant to the chairman of the Atomic Energy Commission, serving in that capacity from October 1953 to October 1954. He was intelligence officer in charge of the New York Branch Office of the Manhattan Engineer District from 1942 to 1946, then was deputy director and chief of operations of the Senate Joint Committe on Atomic Energy until 1948.

He subsequently was special assistant for atomic energy with the Air Force and consultant to other groups on atomic energy until taking over as special assistant to the AEC chairman.

Today, Mr. Teeple is consultant on atomic energy to government agencies and private industry.

What Was in Report?

We have been told that a small but illustrious group within the administrative confines of the atomic energy program attempted to stifle the development of the H-bomb. Only when the decision was submitted for final resolution to the President of the United States did we proceed with a degree of urgency.

It seems the least the American People are entitled to know about nuclear propulsion of aircraft at this date is:

1. What were the recommendations of the Lexington Group in 1949?

2. Who decided to accept or reject them, and why?

3. If experimental results "warrant a sharp intensification and expansion" of the nuclear-powered aircraft program, as Mr. Strauss has testified, why does the 1956 ANP estimated budget represent less than 30% of the budget for the reactor development program? Why do the 1955 budgets for civilian power and naval propulsion reactors each substantially exceed that for aircraft propulsion?

• **A re-examination** of our present position might result in much greater emphasis than is apparently contemplated.

We know that the atomic program of the United States was the subject of intensive and successful espionage on the part of the Soviets. **There is no reason to believe that they neglected to discover the contents of the Lexington report.**

If it was a favorable report, and if the Russians decided to act upon it even though we did not, some one of these May Days in Moscow we may be in for another unpleasant surprise!

• • •

Pan American Places $2-Million Radar Order

Orders totaling $2 million for airborne radar, enough to equip its entire fleet of DC-6s and DC-7s, have been announced by Pan American World Airways. The equipment will be installed on PAA's present fleet of 48 DC-6Bs, seven DC-7Bs now being delivered and 33 DC-7Cs scheduled for delivery next year.

PAA pilots put the equipment through an extensive series of tests in all kinds of weather, flying more than 2,000 hours between the U. S., Europe and South America.

The AVQ-10 radar system being used by Pan Am is made by RCA.

Seaboard Gets Five-Year Certificate For Cargo Service Across Atlantic

Almost eight years after the carrier had filed application for a certificate, President Eisenhower on June 16 approved CAB's recommendation certificating Seaboard & Western Airlines to operae scheduled all-cargo service across the Atlantic for a period of five years.

CAB's 3-2 decision had been submitted to the White House more than a year ago (May 19, 1954).

S&W is authorized to operate freight service between the U. S. co-terminals in New York City, Philadelphia and Baltimore via intermediate points in Newfoundland, Canada and Ireland, and (a) beyond Ireland to intermediates in United Kingdom, Netherlands, Belgium and Western Germany, and a terminal point in Western Germany, and (b) beyond Ireland to intermediates in France and Switzerland and a terminal in Switzerland.

The CAB majority said it was satisfied that there is sufficient cargo potential to warrant certification of an Atlantic freight operator for a temporary period, "even though the amount of such potential cannot be ascertained with precision.

"It is quite possible that a newly-certificated all-cargo carrier may not attain all the traffic which it anticipates. If this should happen, the carrier might have to reduce the contemplated number of schedules or seek to effect greater economies.

"It is also within the realm of possibility that scheduled all-cargo service by an independent carrier may not prove to be economically feasible. This, however, is something that can be determined only by actual experience. Since the service will not be subsidized, it becomes a matter for the new carrier and its shareholders to determine whether as a matter of business judgment it desires to venture its capital in this enterprise . . .

"In the circumstances before us—the tremendous untapped cargo potential, and the availability of postwar aircraft with lower unit operating costs—we would not be properly discharging our duties under the Act if we were to negate the attempt before it is underway, merely because of the fear that it may not succeed."

If a certificate were not issued, CAB said, the field would be left exclusively to foreign carriers such as Airwork Ltd., British operator. There is "clear indication" that service and development of the cargo market is of "secondary or incidental" concern to the present U. S. flag carriers as compared to their passenger service, it said, adding that a new carrier would not only assure availability of cargo planes for national defense needs but would stimulate expansion of cargo service by existing lines.

The majority noted that the case was the result of a reopened proceeding and that there were two significant differences between the original record and the reopened case. First, it said that original proposals to operate DC-4's would not have been economically feasible, but that operations with DC-6's or Super Constellations "would be profitable at load factors of 60% even at substantially reduced rates."

Second, it said that in the reopened case the Defense Department announced an "unequivocal position" favoring establishment and expansion of Atlantic cargo service.

Dissents were filed by Member Chan Gurney and former Member Oswald Ryan who said that the majority decision was based on assumptions as to traffic potential, operating costs and feasibility of drastic rate reductions "which were conjectural and of doubtful validity." They said broadening of the cargo market and securing of lower rates could be accomplished within the framework of the present Atlantic route system.

National defense requirements, they added, cannot "supply an otherwise non-existent economic foundation for the proposed operations."

Negotiations looking toward Eastern-Braniff and Pan American-Panagra-National interchanges between New York and Latin America, as proposed by CAB in the New York-Balboa case, were underway at press time, as the Board extended to June 30 its deadline for conclusion of agreements.

Eastern Air Lines told CAB that it would attempt to enter into an interchange with Braniff, and that discussions were underway. EAL decided not to petition for review of CAB's order disapproving an EAL-PAA interchange.

The long-standing battle between W. R. Grace & Co. and PAA, co-owners of Panagra, broke into the open when it was revealed that Panagra and NAL had signed an interchange agreement, obviously without participation by the PAA interests in Panagra. The agreement, worked out by NAL and the Grace interests in Panagra, was signed on behalf of Panagra by Douglas Campbell, vice president and general manager, and filed with CAB for approval.

Grace told CAB that PAA has since 1938 blocked all its attempts to obtain an extension to the U. S. for Panagra. Ever since CAB's New York-Balboa decision, Grace said, it had tried to contact PAA about working out a NAL-Panagra interchange. After receiving no replies from PAA or being told its officials were "unavailable," Grace said it proceeded to contact NAL, and that the NAL-Panagra interchange agreement resulted.

Meanwhile, PAA's president Juan T. Trippe, wrote CAB that PAA was "taking up negotiations with National . . ." This action was taken after both PAA and EAL decided not to contest CAB's disapproval of an EAL-PAA interchange, he said. PAA-NAL talks were in progress at press time.

Pearson Takes Over As ATA President

Harold L. (Pete) Pearson took over July 1 as president of the Air Transport Association, succeeding Earl D. Johnson, who resigned to become a senior vice president of General Dynamics Corp. Pearson, who had been serving as assistant director of the Bureau of the Budget, was elected at an ATA directors' meeting on June 21.

A native of Kansas City, Kan., Pearson had worked with J. C. Penney, Sears Roebuck and Montgomery Ward, serving as assistant general merchandise manager, vice president, comptroller, treasurer and a director of the latter company. He was also a director of U. S. Gypsum Co.

Harold Pearson

He was named special consultant to the Secretary of the Army shortly after outbreak of the Korean war, and was Deputy Undersecretary from 1952 until February 1954, when he joined the Hoover Commission as director of a task force of subsistence services. He was appointed assistant director of Budget Bureau in May, 1954.

French Aircraft Industry Gets Back on Its Feet

By ANTHONY VANDYK and JEAN-MARIE RICHE

PARIS—The French aircraft industry is now fully re-established as a productive force. This is the main conclusion formed by observers at the 21st international aircraft show here. No longer can France be accused of being good at building interesting prototypes but slow in moving these designs into the production stage.

Although the French industry is naturally the center of attraction at the show, there is such strong participation by manufacturers of other nations, notably Britain, that visitors are able to make a very effective on-the-spot comparison of many of the chief competitive products of the world's aviation industry. As an international show the Paris "Salon" has no equal.

The engine exhibits are regarded by many as the most interesting feature of this year's show. Turbomeca, pioneer of the low-power turbine, has come up with a whole new family of these units as well as a venture in the 2500-lb. thrust bracket, the Gabizo. Hispano-Suiza and SNECMA, the two major French engine manufacturers, have also developed units in this power bracket—the HS Vesta and the SNECMA R.800—both of which are on display at the show. The Vesta is fitted with an afterburner. SNECMA also is showing its new 9500-lb. thrust Atar 8.

- **Among the non-French engines** on show is the Bristol Orpheus 4000-lb. thrust turbojet which is making its first public appearance. Also unveiled to the public for the first time is the Wright J65 with afterburner. Other U. S. engines shown at Paris include the Pratt & Whitney J57 and the General Electric J47. Observers here commented that it was a pity that the Allison T56 was not exhibited in view of the keen current interest in this powerplant.

The absence of the U. S. transport aircraft industry was also deplored by many visitors, particularly since the announcements about the Douglas DC-8 and Lockheed Electra were made just two days before the show opened.

As to French transports, there is no doubt that the SNCASE Caravelle, which made its first flight last month, is the aircraft which is most talked about here. Mundy Peale, president of Republic Aviation Corp., told AMERICAN AVIATION that he was much interested in the aircraft and was awaiting flight performance data on it. Suggestions that the Caravelle is to be built under license by Republic are premature, however.

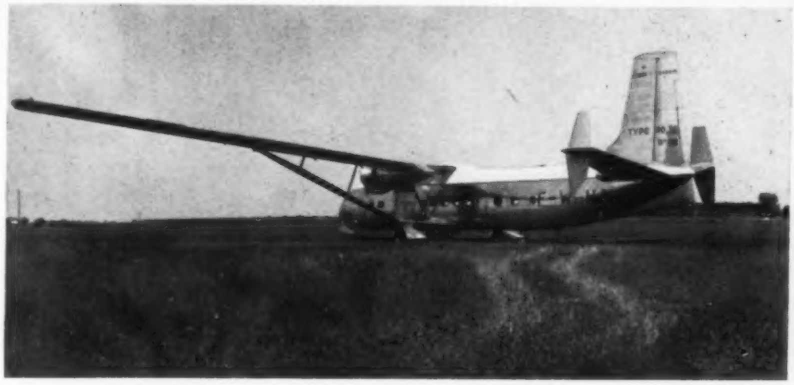
FRANCE'S NEW SUPER MYSTERE IVB supersonic fighter is powered by an Avon engine.

- **Other transport aircraft** displayed at the Paris show include the Hurel-Dubois HD32 which is likely to be produced by SNCASE for both civilian and military customers. Its designer claims that the aircraft can carry twice the payload of a DC-3 using the same engines as employed in the veteran Douglas transport. The HD32 has encountered some stability problems but a new tail configuration is stated to have solved them.

The Breguet 763 Provence or Deux Ponts double-decker transport is likely to be ordered for military use. It is being operated successfully by Air France and may soon enter service with Britavia, British independent airline, as a freighter for use between England and Australia; its capacious fuselage allows unusually bulky cargo to be carried. Twelve Provences have been delivered to date.

The Packet-like Nord 2501 Noratlas is in quantity production for military and airline customers. It is powered

FRANCE'S NO. 1 FIGHTER is the Dassault Mystere IVA, of which 100 have been built.


HUREL DUBOIS HD 32 has a new tail configuration for greater stability.

by two Bristol Hercules engines built under license by SNECMA. An alternate version with P&W R-2800s is projected. About 75 Noratlas aircraft have been delivered so far. The Max Holste 1521 Broussard Beaver-like utility transport has been ordered in large quantities and an export order from a South American country is to be announced shortly; production of 250 is under way.

• **In the helicopter field** the low-cost SNCASO Djinn powered by a Turbomeca Artouste turbine is in production. Another turbine-powered helicopter, the five-place SNCASE Alouette, is in the pre-production stage. Both SNCASO and SNCASE plan large transport helicopters but it is difficult to predict when these projects will be realized. In the convertiplane field Breguet's 940 has an interesting four-engine design incorporating a novel high-lift device which gives a take-off run of 130 ft.

The Dassault Mystere fighter dominates in the military field. Of the various aircraft ordered under the off-show procurement program for the air forces of western Europe, deliveries by Dassault are far ahead of those of other manufacturers. About 100 of the Mystere IVA have been built and 50 have been delivered. Two French Air Force squadrons are equipped with this aircraft. The SNECMA Atar, Hispano-Suiza Tay and Verdon equip the early series Mysteres while the newer models, notably the Super Mystere, have the Avon which is to be built by Hispano-Suiza. Both SNCASO and SNCASE participate in the Mystere production program. Dassault also has a lightweight fighter design, the Breguet Taon,

The best-known French lightweight fighter design, the Breguet Taon, has still not been ordered under the U. S. off-shore program but there is still hope that an order will come through.

U. S. sponsorship is also lacking for the very interesting SNCASE Baroudeur which takes off from a rocket-powered trolley and lands on skids. A pre-production series of this aircraft is being built. SNCASE's main production fighter is the Hispano-Suiza license-built Nene-powered Aquilon, a version of the de Havilland Sea Venom. The company is also active in the manufacture of spare parts for the Republic F-84 fighter series. SNCASE's latest fighter design is the Durandal, a lightweight model. Two prototypes are being built.

• **The SNCASO company's** main combat aircraft in production is the Vautour, an all-weather fighter which is also available in bomber and reconnaissance versions. The production program calls for 140 of these twin-engine planes to be built and most of them probably will be powered by the SNECMA Atar. The most interesting SNCASO aircraft at the moment is the Trident which uses SEPR rockets and Viper auxiliary jets. This high supersonic experimental aircraft may soon be developed into a production fighter.

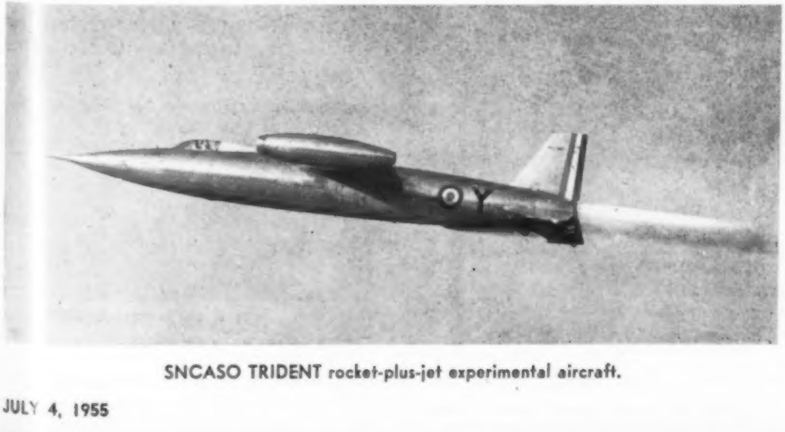
Among the French jet trainers particular mention should be made of the Morane-Saulnier MS 755 Fleuret (the MS760 Paris version of which is currently being shown in the U. S.) and the Fouga 170R Magister, standard jet trainer of the French Air Force and recommended for NATO use. Another interesting French jet trainer is the SIPA 300 which has half the Vampire's performance with only 10% of its power. All French jet trainers use Turbomeca engines.

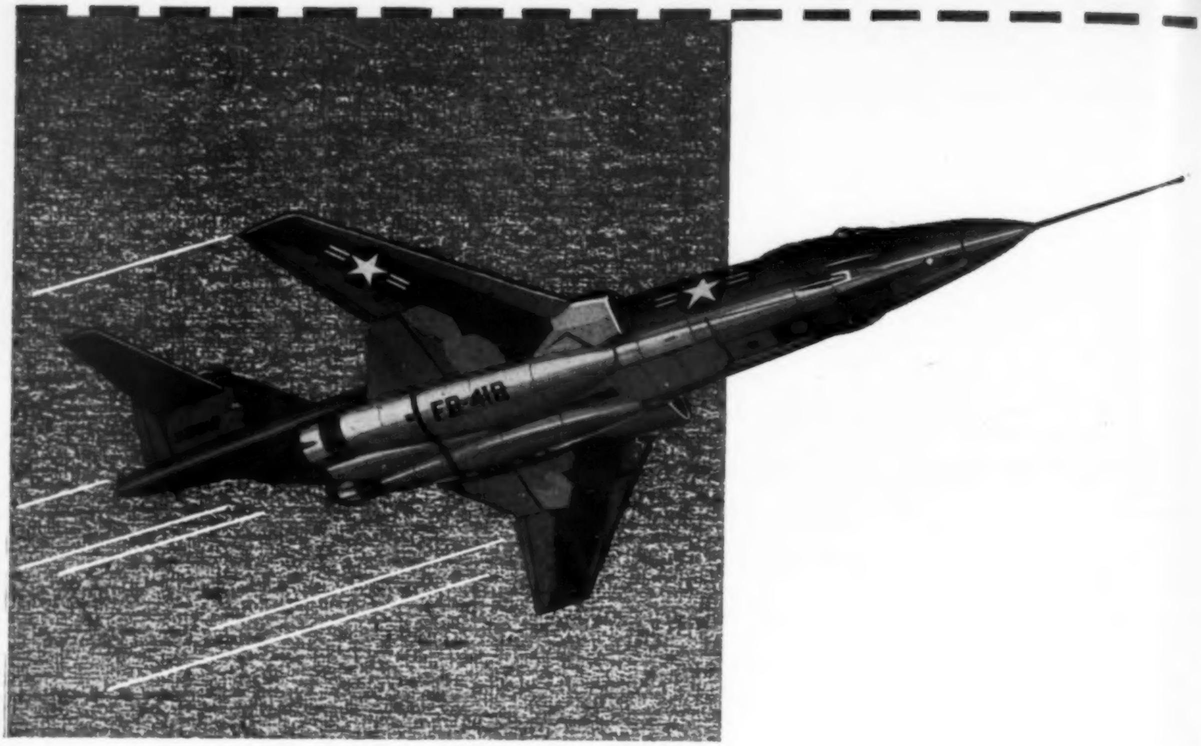
In the piston-engine trainer field the Moran-Saulnier MS 733 alcyon is in large scale production—100 have been delivered to date. SIPA has built a people's light aircraft, the Coccinelle, to sell for a few thousand dollars. SNCAN continues to be the specialist in artillery spotter aircraft—over half of the 160 Norvigie planes ordered have been delivered. SNCAN is currently working on a lightweight fighter, the Harpon.

• **Among the other** French manufacturers mention should be made of the Leduc ramjet-powered experimental aircraft which somewhat resemble some of the coleopter designs unveiled at the show by the Bureau Technique Zborowshi Co. The supersonic SFECMAS (SNCAN) Gerfaut and the Payen PA49 experimental deltas are also of interest as is the unusual slow-flying Potez 75 "tank buster."

This necessarily brief and incomplete review of some of the French aircraft industry's products should not be ended without mention of some statistics. Today there are twelve airframe manufacturers in France and five engine companies. The nationalized airframe manufacturers employ 20,000 workers while the private firms employ half that number. There are 13,000 people working in engine companies while aviation equipment manufacturers account for a further 17,000. The majority of the companies are members of the French Aircraft Industries Association, the USIA, which organized the Paris show every other year.

Since the war the French aircraft industry has built some 7000 aircraft and over 1600 sailplanes. Last year the industry's exports were worth over five million French francs. The industry's backlog has never been higher than it is today and the prospects have never been brighter.


SNCASO TRIDENT rocket-plus-jet experimental aircraft.



Air Forces give McDonnell's new debutante a big rush!

TEMCO HELPS PRODUCE POPULAR F-101 *VOODOO*

When the F-101 made her first public bow, she was already a much sought after plane. Designed as a long-range fighter, the *Voodoo* will first be assigned to the Strategic Air Command to escort our jet bombers. But interceptor and tactical air groups also are casting covetous looks at this big new jet. Reportedly the most powerful fighter in the world capable of cruising at well over the speed of sound for hours, she is wanted for defense against bombers and for use as a supersonic fighter-bomber.

To facilitate production of this important plane, TEMCO was called upon to fabricate aft fuselage sections. The award of this contract indicates the thoroughly satisfactory manner in which TEMCO has been handling work on another McDonnell fighter, the F3H *Demon*, and further establishes TEMCO's reputation for producing a quality product, on schedule, at the lowest possible cost.

Final assembly and inspection of aft fuselage section of F-101 prior to delivery to McDonnell.

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U.S. - German Air Agreement Unsigned; Flood of Protests Reaches White House

The controversial civil air agreement concluded by the U. S. with Germany was still unsigned at press time, and whether the terms of the pact will be modified was undecided.

A flood of protests from U. S. airlines hit the White House, State Department, CAB and Congress in mid-June when it was revealed that the U. S. was about to sign an agreement granting the Germans a route to Boston, New York, Philadelphia and beyond to South America, a route to Chicago via Canada, and a polar route to San Francisco or Los Angeles. The U. S. would receive five German cities now served (Frankfurt, Dusseldorf-Cologne-Bonn, Hamburg, Stuttgart and Munich) plus rights beyond Germany.

Scheduled signing of the agreement was halted when the Senate Interstate and Foreign Commerce Committee demanded that CAB, State Department and airline officials appear before it and explain the negotiations. After the hearings, Sen. Warren G. Magnuson (D., Wash.), committee chairman, suggested that the agreement be "re-examined" and that the airlines be given another opportunity to express their views.

Additional hearing was held before four CAB members on June 22, and there the matter rested at press time.

The Senate committee hearings developed that:

- **The airlines** had never been consulted during the negotiations regarding a South American route for the Germans. They learned about the grant after the agreement had been concluded.
- **At least one branch** of the State Department did not agree with the routes given to the Germans. Dissent was made by Henry F. Holland, Assistant Secretary of State for Inter-American Affairs.
- **Pan American World Airways,** National Airlines and Braniff Airways asserted that the Germans had received too much. Some witnesses said it was a "giveaway."

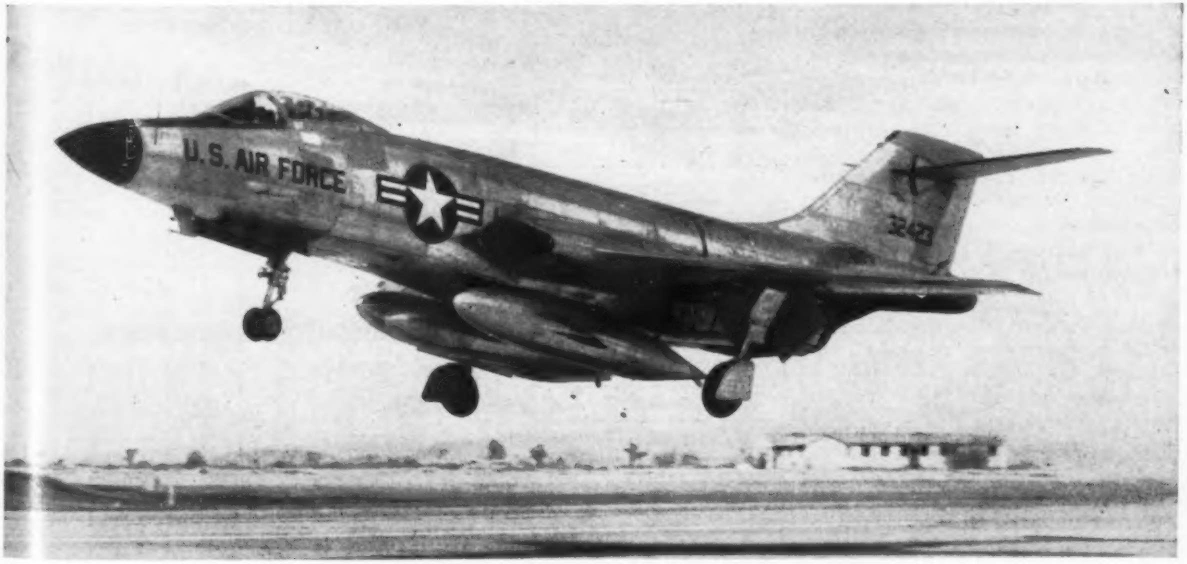
Trans World Airlines, on the other hand, supported the U. S. negotiators and urged that the agreement be signed.

Sen. Magnuson and airline witnesses rapped the State Department for failing to have top-level personnel with a knowledge of the air transport industry who could represent the U. S. in bilateral negotiations. Sen. Magnuson said foreign nations are represented by ministers or high-level officials "who frequently find they have to deal with our representatives who may be officials of a sub-department of a sub-department."

Strong defense of the agreement came from Thorsten V. Kalijarvi, Deputy Assistant Secretary of State. Predicting that Germany will become the world's third greatest air transport power, Kalijarvi said "a proposition has been discussed in Germany and other European countries concerning the closing of the European area and the institution of a system of cabotage. U. S. airlines would take a terrific beating."

For this reason, he said, the U. S. feels it important to have Germany operating on the same basic philosophy (Bermuda principles) as the U. S. The Germans can then be expected to make similar agreements with other countries, he added.

Although there was no indication at press time as to whether there would be further talks with the Germans, Sen. Magnuson left little doubt that he expected some action. In a letter to CAB Chairman Ross Rizley, in which he referred to "resumption of further negotiations," he stated: "It seems to the committee that our negotiations should not be hampered by conditions which grant to any foreign nation a 'hunting license' to jeopardize our legitimate aviation markets."



AF Plans to Increase F-101 Production

Air Force Secretary Talbott has announced plans for increased production of the McDonnell F-101 long range penetration fighter and the Lockheed F-10 as well as the Boeing B-52 long-range bomber.

Here are latest pictures of the F-101A, heaviest and longest range fighter in production. These are the first pictures of the supersonic Voodoo fitted with external fuel tanks. Shift of tanks from wingtips is the "new look" in thin-wing supersonic fighters. The F-101 is capable of convoying B-52s on long missions and also reportedly is being planned as an Air Defense Command interceptor.

Picture shows Voodoo taking off.

Labor Trains 'G.A.W.' Guns on Aircraft Industry

By ALBERT D. HUGHES and ARTHUR J. NEWFIELD

THE AIRCRAFT industry will be one of labor's next big targets for increased unemployment compensation, the so-called Guaranteed Annual Wage (GAW), at the end of March, 1956. This is the probable target date for the initiation of union demands on the aircraft industry.

Even though the aircraft industry behaves more cyclically than the automobile industry, because of its greater dependence on government contracts, the principles of the current contracts between Ford, General Motors and the UAW-CIO could very well be applied to the aircraft industry.

The current "GAW" pacts are simply company underwriting of increased unemployment compensation benefits, but are viewed in most quarters as a "foot in the door" for labor's ultimate goal of the guaranteed annual wage.

The plan is geared to the number of employes on the payroll at any given time. As the number of employes rises, the payment to a central fund increases, but as the number of employes decreases contribution is decreased accordingly. This provision removes the auto contracts from the GAW category.

The auto agreements are considered GAW contracts because unemployment benefits are not paid out of current income but from previous contributions to the fund and there is no guarantee whatsoever regarding a specified period of employment. In short, the agreements are expanded unemployment compensation.

- **It has been noted** by several astute observers that the auto companies are taking over where the New Deal left off. During the 30s it was the policy for the government to "guarantee" unemployment compensation, pension (social security), etc. These "obligations" apparently have now reverted to private industry.

Most aviation people are dubious whether such a plan can be applied to a defense industry. The fact remains that the UAW already has met this problem head on.

There are two funds out of which increased unemployment compensation will be paid. Contributions will be made at the rate of 5c per hour per worker into one of two trust funds. One fund is for defense workers. The other is for employes not engaged in defense work. This provision might very well pave the way for a so-called GAW in defense industries. The UAW probably was eyeing the growing aircraft industry.

Union officials probably will encounter little difficulty in selling this plan to unionized workers in the aircraft industry since these workers are in greater danger of being unemployed than their brother members making automobiles. The great appeal of increased unemployment compensation to union members in aviation is rather obvious.

It has been conjectured that labor would prefer not to risk public or government censure for striking defense industries. Nevertheless, the CIO-Autoworkers did skate close to it in their threat to call out workers at the Ford Aircraft Engine Division in Chicago and the Aircraft Division in Kansas City. Settlement of the Ford strike meant that the production of critically needed P&W-licensed J57 turbojet engines could continue at Chicago as well as assemblies for several new military aircraft at Kansas City.

- **Roy M. Brown,** general vice president of the American Federation of Labor's International Association of Machinists (IAM-AFL) union, recently stated that guaranteed annual wage demands as presented by the UAW-CIO are not feasible in the aircraft industry. Other prominent labor sources, however, say that this is not necessarily an overall labor view.

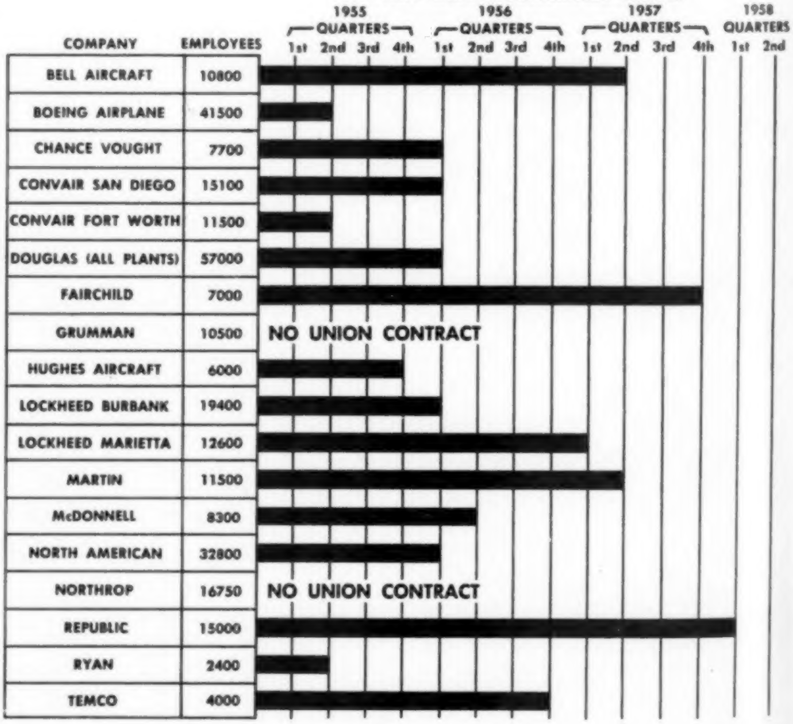
The UAW-CIO tapered its original GAW demands considerably to win management approval.

- **Under the original** plan, workers with two or more years of seniority would have been guaranteed work or pay for one year.

- **Under the new** plan, automotive workers are guaranteed benefits up to 26 weeks, as follows: benefits would be dovetailed with state unemployment compensation checks so that a laid-off worker would get 65% of his normal take-home pay during the first four eligible weeks; 60% of his take-home pay for all following weeks.

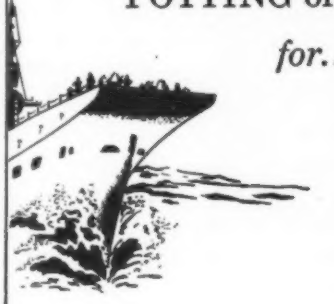
The new program, called a "supplemental unemployment benefit plan," calls for the setting up of a fund from which workers would draw layoff pay. Ford, for instance, will start contributing money immediately into a fund though the money will not become

WHEN LABOR CONTRACTS EXPIRE

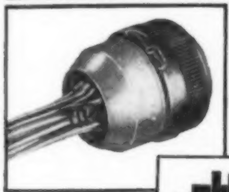


NEWEST METHOD OF SEALING AGAINST MOISTURE

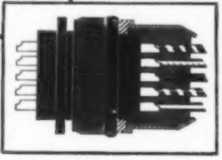
POTTING of Cannon Connectors



for...
1. ***Positive sealing*** against moisture, dirt, and other foreign matter.
2. ***Weight saving*** because of elimination of end bell and cable clamp.
3. ***Space saving*** due to shorter overall length.
4. ***Prevention of wire fatigue*** under extreme vibration.
5. ***Improved dielectric characteristics.***



Typical completed potted connector



Individual wires and elements are thoroughly sealed

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CAO6BR Plug • Plastic Inserts
12S to 48 Sizes
CAO6ES Plug • Resilient Inserts
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CA3106BS Plug • Plastic Inserts
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CA3106ES Plug • Resilient Inserts
8S to 36 Sizes*
CA3106ER Plug • Resilient Inserts
8S to 36 Sizes*

**less grounding means*

Receptacles also available for potting.

Plugs and receptacles available with either pin or socket assemblies.

Please Note: Many other connectors may be potted by devising proper potting techniques.

CANNON Potting Molds

Nylon potting cup

Aluminum end bell

How It's Done...

Potting is a newly developed method of obtaining complete protection, covering, and sealing around the solder cups and wires at the rear of electric connectors by means of a sealing compound applied at the time the connectors are wired into their assemblies. The terminal area enclosed by the plug or receptacle end bell is filled or potted with a free flowing high solids synthetic rubber compound. This cures at room temperature to form a firm, resilient, moisture and vibration resistant rubber seal.

Clean the Connector...

The connector should be free of grease, oil and wax in order to insure good adhesion. Do not expose insulating materials to the cleaning solvent beyond the time necessary for adequate cleaning. *See the new Cannon Manual on Potting for complete information.*

Mixing the Compound...

Compounds are usually furnished as a basic sealant compound and an accelerator. Mixing must be done carefully, either by hand or with power equipment. *This subject is covered fully in new Cannon Manual on Potting.*

Applying the Sealant...

Application of the sealant can be made with a small paddle-shaped tool, spatula, putty knife or a flow gun. However, the flow gun is the preferred method where larger quantities of the plugs are to be sealed. *Methods are discussed fully in the new Cannon Manual on Potting.*

Potting Machines...

Large quantity runs can be handled economically by potting machines. Typical equipment of this nature is illustrated here.

Potting machine in use

Potting by hand

Curing Time...

Curing time and the methods used are very important. The length of time that it takes for the sealant to harden and cure varies with the material used. Generally, the length of cure time depends upon the work life of the compound. A longer work life increases and short work life decreases the cure period. *See the new Cannon Potting Manual for complete details.*

MIL-S-8516 (Aer) is basic specification on sealing compounds for electric connectors and electric systems. BuAer Bulletin Aer-EL-35 covers electric connector sealing to prevent contamination, improve reliability.

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available to laid-off workers until June 1, 1956.

The union claims that workers also received pension improvement of 4.5¢ per hour, benefits of 6¢ an hour for improvement factors and fringe benefits totaling 3.7¢ per hour. Fringe allowances included larger retirement and employe insurance benefits, longer vacations for veteran employes and additional paid holidays.

• **There are different views** by management and labor on the cost of this reserve layoff benefit fund. An official of the National Association of Manufacturers has charged that the fund cost, as originally presented, would be 40% of the payroll. Walter Reuther, CIO president, estimated that the cost of the current wage "package" would be "in excess of 20¢ an hour," which compares with a previous high of 18¢ an hour for the 1946 contract costs.

The UAW also maintained that since the reserve fund is not taxable, the net cost to the company would be only four cents an hour, and estimated that the net cost of building up a reserve fund would be about the same as Ford and General Motors gained in 1954 by the elimination of the excess profits tax.

Observers familiar with labor strategy point out that conditions are favorable for a labor assault on aircraft wage structures and other fringe benefits in March, 1956. These sources say that automobile negotiations will be concluded, and the AFL-CIO merger a fait accompli, at the end of 1955.

Moreover, craft unions of the CIO and AFL in 21 Bendix Aviation Corp. plants meeting in Washington, D. C., have co-operated by setting up an interim committee to co-ordinate bargaining objectives. Further meetings of this powerful group have been scheduled, as well as meetings of the full union delegates' group.

These meetings have been going on even as top officials of the CIO and AFL, having drafted their new constitution, are discussing who is to perform various staff functions for the merged CIO-AFL movement.

• **At a recent meeting** in Washington, D. C., furthermore, the guaranteed annual wage plan was discussed and delegates from the Bendix unions were told that IAM's executive council had voted to give full support to the UAW-CIO locals now seeking to negotiate that program. Thus, GAW plan or not, the stage is set for the combined bargaining strength and objectives of united labor to be concentrated on other branches of the aircraft industry.

Unions usually try to concentrate their demands on a single industry at a time, instead of spreading their fire. During the current automobile-GAW negotiation, observers note, no other major industry is a target. In the past rival unions tried to time their demands on a non-interfering basis. With the merger a fact, timing will be improved and union interference a thing of the past.

While the steel industry may appear to be the next logical target for GAW after automobiles, there are several reasons why the aircraft industry may receive union attention before steel.

Most prominent among them is the fact that steel union contracts affecting approximately 600,000 workers will not expire until June 30, 1956, the next quarter after a number of major airframe contracts lapse. Though a reopening of hourly wage rates in steel comes at the end of this month (June), the steel contracts will not be fully renegotiated until the following year.

• **David J. McDonald,** president of the United Steelworkers of America (USA-CIO), has stated, moreover, that "GAW is not a bargaining point issue in basic steel this year." A less favorable aspect for the aircraft industry, too, is that it is not a consumer industry and, thus, might become labor's first target in industry devoted to defense production.

Aircraft industry's profits are good as shown by the accompanying table. This is a major point upon which labor will base its claims.

Net Income After Taxes
(In Millions)

Company	1954	1953
Bell Aircraft	$ 6,404	$ 3,465
Boeing Airplane ..	36,976	20,318
Chance Vought Aircraft	6,640	.....
General Dynamics	20,795	13,193
Douglas Aircraft ..	36,157	18,586
Fairchild Engine & Airplane	4,134	4,014
Grumman Aircraft	11,215	7,129
Lockheed Aircraft .	22,446	15,462
Glenn L. Martin Co.	20,052	15,095
McDonnell Aircraft	3,621	4,234
North American Aviation	22,180	12,733
Northrop Aircraft .	3,829	3,360
Republic Aviation .	8,977	8,314
Ryan Aeronautical	1,962	1,475
Temco Aircraft ..	2,937	2,668
Total	$208,325	$130,046

An AMERICAN AVIATION survey of aircraft labor contract terminations shows that at the end of the first quarter of 1956 five major labor contracts in-

THESE LABOR LEADERS will play prominent roles when bargaining begins with aircraft industry management. Top left, A. J. Hayes, international president of IAM (AFL); right, Walter Reuther, president of CIO. Bottom left, Roy M. Brown, general vp IAM; right, John Livingston, director of UAW's (CIO) National Aircraft Department.

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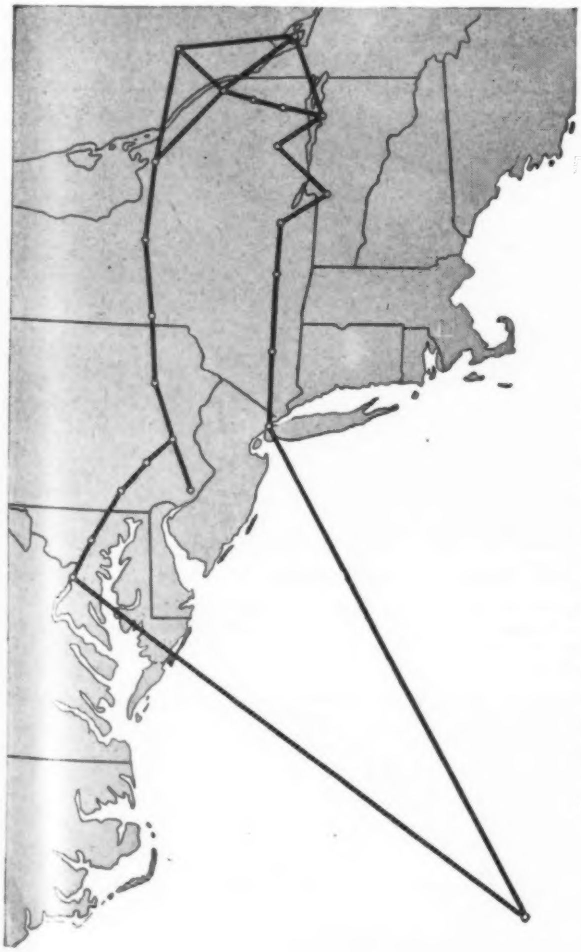
COLONIAL AIRLINES' SILVER ANNIVERSARY OF SAFETY!



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volving a total of 132,000 production aircraft employes will expire. At that time, five major airframe company contracts — Douglas, Lockheed-Burbank, North American, Convair-San Diego, and Chance Vought Aircraft — will come up for negotiation.

Since the production employes of these five companies constitute 51.4% of the total of 256,000 unionized employes of 14 of the 16 companies included in this survey, the five companies may be fairly considered a "big target."

There is a possibility that by extension of negotiations the five-company target could be augmented to a seven-company target. The contract of the Hughes Aircraft Co.'s 6,000 workers with the Carpenters and Joiners-AFL union, representing 2.3% of the total, expires at the end of 1955. The McDonnell Aircraft contract with 8,000 members of IAM-AFL, representing 3.2% of the total, expires in the second quarter of 1956. These seven companies' workers would represent 56.9% of the total of the unionized workers in this survey.

As aircraft labor will be merged, its members will have common wage and fringe benefit goals initially in the five-company negotiations in March, 1956. Of the total of 132,000 union employes in these five companies, 67,500 are members of the IAM-AFL, and 64,500 are members of the UAW-CIO.

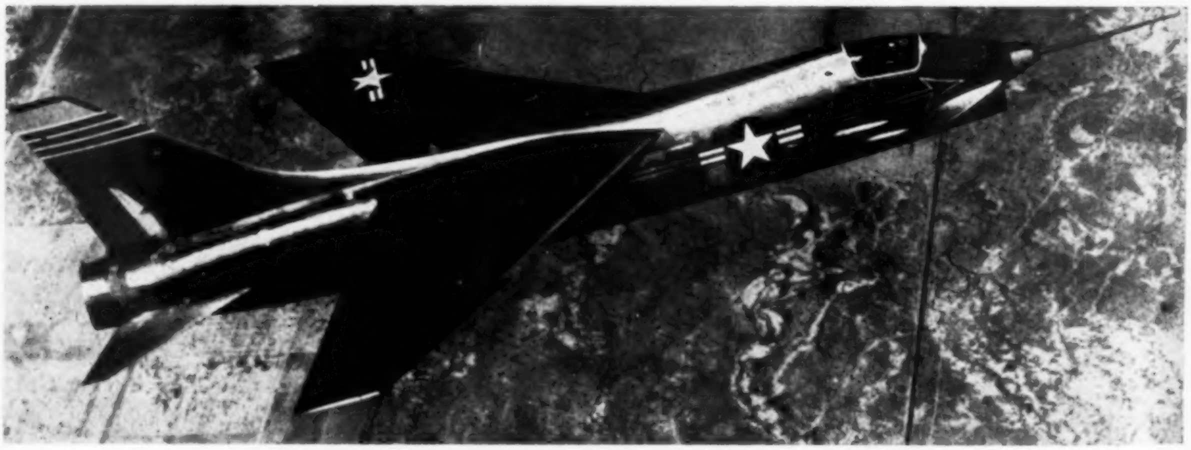
Douglas is the only airframe manufacturer whose production workers are represented by both the IAM and the UAW—33,000 IAM-AFL members in its Santa Monica and El Segundo, Calif., plants, and 24,000 UAW-CIO members in its Long Beach, Calif., and Tulsa, Okla., divisions. In contrast, North American Aviation has a master contract with the UAW-CIO covering all four divisions and a total of 32,800 production employes.

Another factor indicating union intentions, observers say, is the length of the contracts which the unions currently are willing to sign. If the unions are signing up for only one-year agreements they possibly may be building up an even bigger "target" in 1956.

The negotiations to watch in order to gauge union intentions will be those taking place currently. The contracts of Boeing, Convair-Fort Worth and Ryan Aeronautical expire at the end of June. These two companies and one division have a total of 55,400 production employes, who represent 21.6% of the total of unionized employes considered in this report.

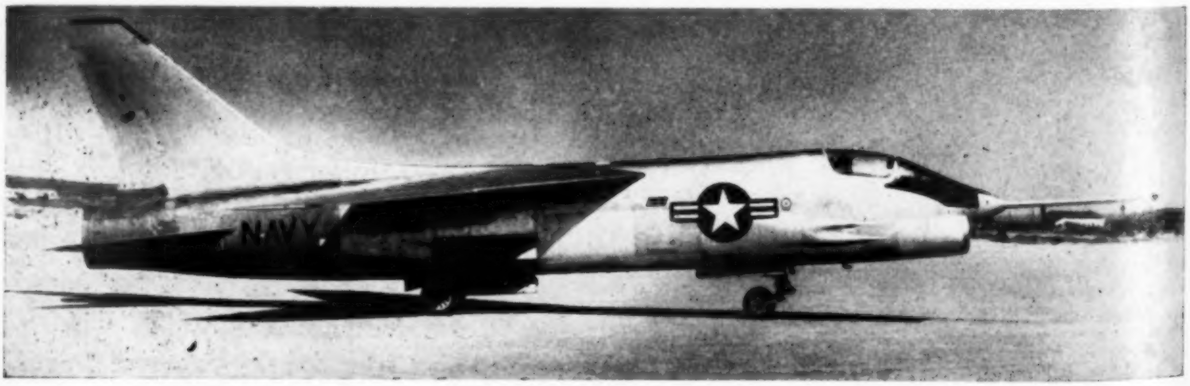
Now, should the unions negotiate short-term contracts with Boeing, Convair-Fort Worth and Ryan to make them coincide with the seven companies' termination date of March 1956, or thereabouts, they would unquestionably be setting up an even bigger target. Thus, nine companies' production workers would constitute 78.3% of the total production workers under consideration.

An opportunity to fire demands at such a big target would not exist for the aircraft labor unions again until a year later, or sometime between the first and second quarters of 1957. At that time the contracts of Bell, Lockheed-Marietta, Martin and Temco will come up for negotiation, representing a total of 38,900 production workers, or 13.6% of the survey total. • • •



FIRST PICTURES OF CHANCE VOUGHT XF8U-1 NAVY FIGHTER

Navy's newest jet day fighter is the Chance Vought Aircraft XF8U-1, powered by a Pratt & Whitney J-57-P-4 engine with afterburner. The XF8U-1, designed as a supersonic carrier aircraft currently is undergoing tests at Edwards AFB, Calif. The new plane marks a substantial change in Chance Vought-designed fighters, with a thin sweptwing mounted high on fuselage and horizontal tail joined low on the fuselage. Short, pointed nose fairs into a small cockpit canopy to reduce drag and increase pilot view.



Turbine Transport Key: Self-Containment

Self-containment for turbine-powered transports keynoted a symposium on component systems held at the Belair Hotel in Los Angeles under sponsorship of The Garrett Corp.'s AiResearch division and attended by engineering representatives of the airlines.

W. R. Ramseur, vice president and chief engineer, summed up AiResearch's accessory equipment recommendations for turbojet or turboprop transports as follows:

- Separate cabin compressors as against direct engine bleed.
- Air cycle as against vapor cycle refrigeration.
- Four pneumatic turbine engine starters as against fuel-air combustion.
- One gas turbine located in the airplane to make it self-sufficient with regard to starting, electrical and hydraulic energy, and heating, ventilating and cooling of the cabin.

• **The current risk** in making a committment to use high pressure and temperature bleed air does not appear to be a good gamble, said Ramseur. This conclusion is reached from military experience indicating some turbine engines deliver consistently contaminated bleed air. This oil contamination produces noxious odors in the cabin and even eye and nose irritation.

Holding strictly to the simplest and lightest equipment for flight alone would make ground handling extremely difficult, if not intolerable, Ramseur declared. Some ground support equipment will have to be carried as dead weight in flight, he said.

AiResearch has been a consistent advocate of the pneumatic turbine for engine starting and auxiliary power since it first started its small gas turbine development program after World War II.

• **Latest unit** is its GTC85 series. This is a two-stage radial compressor with backward curved impeller blades coupled to a radial in-flow turbine. Dry weight of a unit producing compressed air energy only is 180 pounds. Both compressed air and shaft power, either separately or in combination, may be obtained for an additional 35 pounds, or 215 pounds dry.

Installation weight depends upon location in the aircraft, but it is estimated a GTCP85 (air and shaft power) can be installed for a weight of 440 pounds, including the alternator.

In a turbine transport, however, I. E. Speer, AiResearch's senior product

This is an AiResearch "one-family" component system envisioned for a large turbine powered transport:

SYSTEM & COMPONENTS	POSSIBLE NUMBER PER AIRCRAFT
Air Conditioning System	
Refrigeration turbine and heat exchanger	2
Water separator	2
Humidifier system	2
Cabin temperature controls	(as required)
Air flow regulator (venturi type)	2
Pneumatic air shutoff valves	2
Necessary hardware	(as required)

FUNCTION

Gas turbine engines drive compressors to direct ambient air through heat exchanger and refrigeration turbines to automatically create or maintain pre-set or selected cabin temperature for ground operation, to make the aircraft self-contained on the ground. The same air conditioning components can be utilized with engine bleed for inflight operation. Integral AiResearch temperature controls govern automatic operation of the system.

PRESSURIZATION SYSTEM	
Cabin pressure controller	1
Outflow valve	1
Safety valve	1

FUNCTION

A cabin pressure controller automatically provides manually selected or pre-set differentials or pressures. Safety and outflow valves combine pressure relief, vacuum relief and cabin depressurization features. All components in this system may be independently replaced without recalibration of the system. Provision is made for manual override of the system for emergency operation.

PNEUMATIC POWER SYSTEM	
Gas turbine engines	2
Air turbine motor	1
Air turbine starters	4
Ram air turbine	1
Necessary hardware	(as required)

FUNCTION

This self-contained system provides auxiliary and standby power sources which include gas turbine engines to supply electrical or hydraulic power, and pneumatic power for main engine starting, as well as airflow for ground cabin air condition. An integral air turbine starter system eliminates the need for auxiliary ground power source. The auxiliary pneumatic power may also furnish added, or standby, power for ground heating and cooling, powering actuators, and other requirements. An additional inflight power source may be included in the form of a ram air turbine which may be extended into the air stream, or receive ducted ram air, to supply emergency power for control systems. Air turbine motors may also be included to provide power for other normal or emergency requirements.

DE-ICING, DE-FOGGING AND DE-FROSTING	
Automatic temperature controls	(as required)
Modulating valves (wing and empennage)	"
Shutoff valves	"
Dump valve	"
Pressure reducer valves	"

FUNCTION

A series of pressure reducers, modulating valves, and shutoff valves, provide main engine bleed for automatic thermal de-icing of wings and empennage. Provision is also made for automatic windshield de-frosting and de-fogging. A fail safe dump valve guards the system.

AIR DATA COMPUTER SYSTEM	
Central air data computer	(as required)
Servoed airstream direction transducer (angle of attack)	"
Servoed airstream direction transducer (angle of yaw)	"
Total temperature transducer	"
Mechanical advantage control	"
Mechanical advantage shifter	"
Cruise control computer	"
Variable area actuator	"
Engine pressure radio transducer	"
Pitot-static pickup	"
Static pressure transducer	"
Three axis accelerater	"
Elevator trim servo system	"

FUNCTION

The effectiveness of high performance aircraft is largely dependent upon inflight adjustment to the surrounding air. The data computer system integrates pneumatic, electrical and electronic information derived from sensing mechanisms in the airstream to provide the pilot and flight engineer with vital information, as well as automatic systems control for achieving the high performance for which the aircraft is capable. These are some of the functions:

True air speed
Functions of Mach number
Density altitude
Rate altitude
Engine pressure ratio
True angle of attack and yaw
True dynamic pressure
True static temperature
Mechanical advantage shifter
Cruise control computer

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Aviation zooms into the future with this new, and vastly advanced, Bendix automatic flight system. Just perfected . . . after long research and development . . . by Eclipse-Pioneer, the *completely-transistorized, flight-tested* PB-20 offers the complete answer to all the varying needs of modern high-performance aircraft—needs which are beyond the scope of "standard" auto pilots. Consider some of the PB-20's advantages:

Incredibly close control over any subsonic cruise profile. The PB-20 incorporates an air data sensor so precise and so efficient that it will sense pressure changes to a finer degree than ever before possible. That's one of many reasons it will meet all the control needs of today's and tomorrow's subsonic aircraft. Automatic power control is available, if desired.

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A few of many other PB-20 advantages:

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- AVAILABLE WITH EITHER ELECTRIC OR HYDRAULIC SERVOS
- MINIATURIZATION THAT SAVES SPACE AND WEIGHT
- INTEGRAL BEAM GUIDANCE WITHOUT ADDITIONAL COUPLERS
- CHOICE OF MANEUVERING CONTROLLER OR CONTROL STICK STEERING OR BOTH

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application engineer, points out that this weight penalty may be offset by such factors as the high fuel consumption of the main engines.

"In addition to the fact that the general power level of turbine engines is higher than past reciprocating engines, the ratio of fuel consumed at idle to that consumed at cruise power is many times greater than that of reciprocating engines," said Speer.

"For example, estimated fuel consumption of the T56 turboprop engine at idle is 610 pounds per hour. It appears that the ground operation of two T56 engines will be required to supply system energy requirements and at crowded airports an average of about 15 minutes will be required for takeoff clearance. However, practical operating considerations might require about 30 minutes of fuel for such holding operation.

"Thus, 610 pounds of fuel would be required to be carried for system energy requirements while the aircraft is away from the ramp area awaiting takeoff clearance and an average of about 305 pounds would be burned."

• **Speer then concludes** that an airplane equipped with a 440-pound auxiliary power unit installation might even leave the ramp 70 pounds lighter than if it were depending on the main engines to provide the away-from-the-ramp services.

"We do not feel that engineers opposing the use of small gas turbines are familiar with the rapid strides made in clearing up difficulties with the original units in service or with the advancement made in the new types such as the GTC85 series," said Ramseur.

The small gas turbine has the advantage of giving main engines an infinite number of starts at any location and keeping passengers comfortable, said Ramseur.

"It is capable of more than offsetting its installed weight during long holding periods," he continued. "It should offer no more fire hazard on the ground than the fuel-air starter and it is not subject to rapid high pressure leakage loss such as encountered in 3000 psi pneumatic systems. It can crank for long periods of time, which is of extreme importance in blowing out main engine tail pipe fires."

• **For main engine starting,** the small gas turbine would be used in combination with a low pressure pneumatic starter. AiResearch is now producing a 27.5-pound starter nominally rated at 140 hp, which will start a J57, J79, J71, J67 or similar engines. Later versions of this unit will weigh 23 pounds, according to W. E. Parker, project engineer on power turbines.

A smaller 20-pound unit will start a T56 and similar engines. Tests have indicated a life of 1,000 starts between overhauls and some have been operated for nearly 1,800 cycles with only nominal wear, Parker said.

In evaluating pressurized air sources, J. L. Bartlett, project engineer on airplane systems, noted that in a flight of five-hour duration 45,000 pounds of air (9,000 pounds per hour) would be passing through the cabin of a 100-passenger turbojet airplane to provide a ventilation rate of 1.5 pounds per minute of cabin air per passenger. This weight, he pointed out, would be of the same order of magnitude as the weight of fuel burned during the flight.

• **Water removal** need no longer be considered a short-coming of the air cycle refrigeration system, R. M. Pickard, assistant project engineer on airplane systems, told the airline engineers.

AiResearch, he said, has developed a water separator configuration for turbine transports, which is comparable to that of the vapor cycle system.

AiResearch proposes the use of two complete air conditioning systems per airplane sized for one-half the cabin flow. This, Pickard said, provides a measure of reliability in that loss of one compressor would not reduce capacity as much as the same occurrence with a system in which two compressors feed a single refrigeration unit. Vapor cycle cooling would entail a weight penalty of 240 pounds or more compared to air cycle, it was reported at the symposium.

S. E. Westman, project engineer on flight instruments and controls, discussed the pressure ratio method of thrust indication to determine optimum conditions for takeoff and cruise. Engines expected to power jet transports such as the P&W J57, have a very flat thrust versus rpm curve and a variation of 1% in rpm gives about a 5% change in thrust.

• **The pressure ratio** indication is less sensitive to takeoff use than the differential method, but it is more sensitive at high altitudes, and it appears to be more convenient and accurate for the pilot for use in cruise, Westman said.

• • •

Circular Screen Cuts Jet Ground Noise

Use of a simple circular screen strategically placed in the exhaust path of a jet engine is showing considerable promise as a low-cost, portable, noise-reduction device for jet aircraft ground operations.

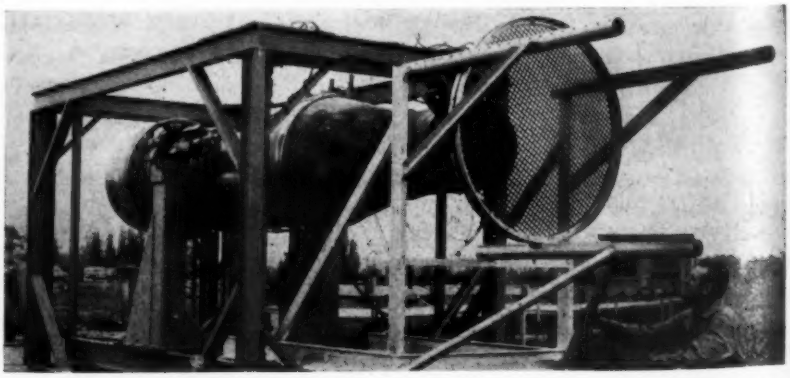
Tests at National Advisory Committee for Aeronautics' Lewis Flight Propulsion Laboratory have demonstrated that properly placed screens can lower the power level radiated by the engine more than 7.5 decibels.

From an overall standpoint, NACA found that a 1-mesh, 0.250-in. diameter wire screen offered the best compromise for non-critical resonance operation, structural integrity, and noise reduction. Screen used in tests measured about 44 in. in diameter.

This type screen produced no resonance as far as 27 inches downstream of the jet exit, caused a decrease of about 6 decibels in power level, and suffered little or no wire damage.

Even further improvement over this performance might be obtained by substituting properly shaped airfoils for wires, NACA feels. Reason is that the wire screen in its present form, although an effective noise suppressor, also serves to generate a considerable portion of the noise from the engine-screen combination.

NACA tests showed that screen positioning downstream of the jet is most critical. At less than six inches from the exit a back pressure on the engine was recorded. At more than 12 inches downstream, certain screens produced resonant noises with sound powers sufficient to damage the fine-mesh screens.



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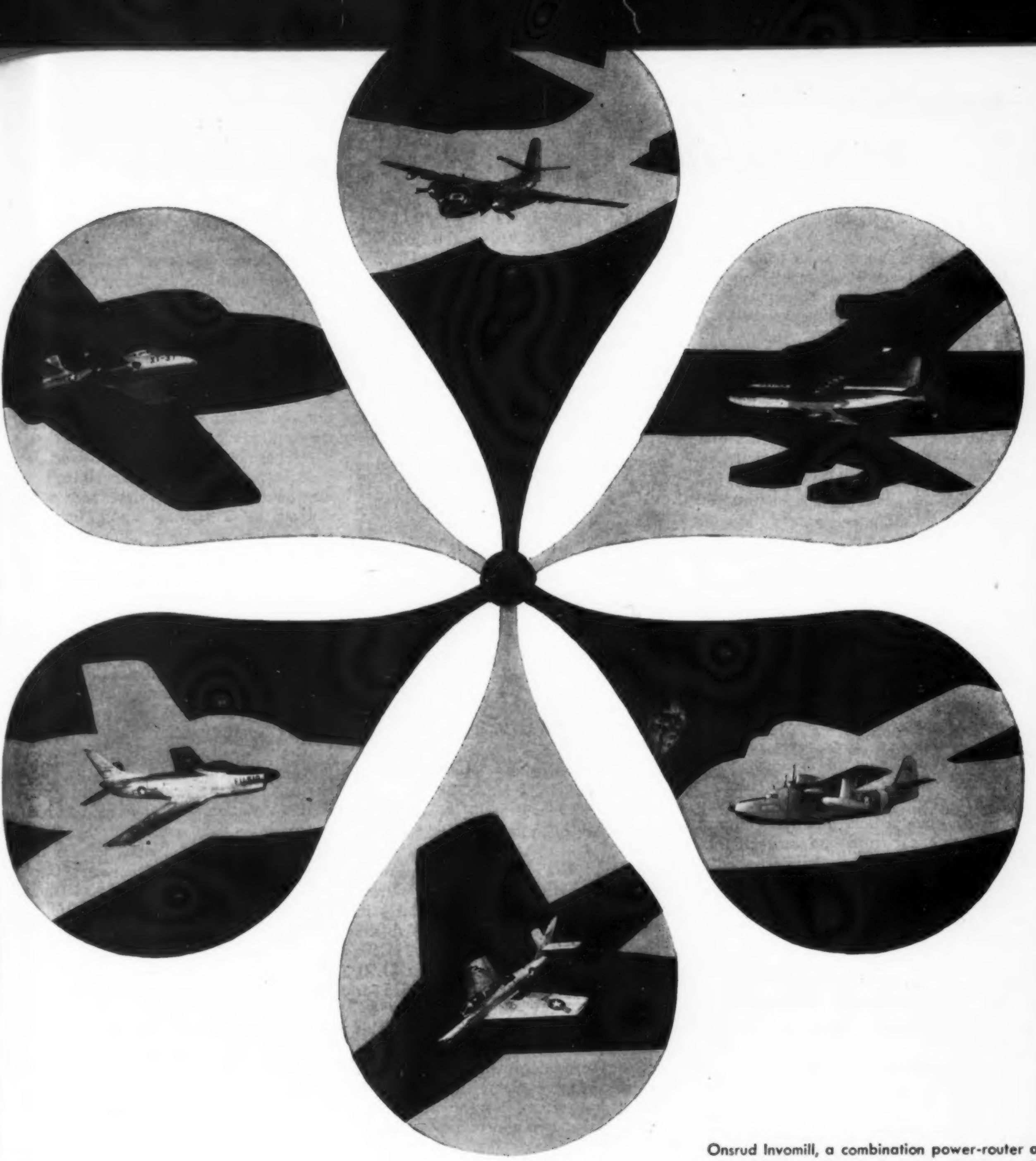

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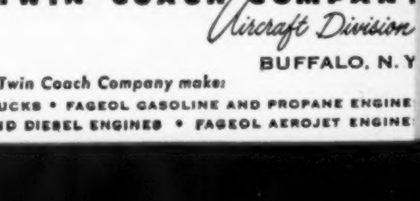

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Men and Ideas

Dick Mock's Ideas Help Lear Grow

By FRED HUNTER

It's management policy at Lear Inc. to give preference to present employes. But they always must be equal or superior to those the company could hire outside.

This attaches added significance to the fact that Richard M. Mock became president by climbing the promotion ladder. He started at Lear 15 years ago as sales manager of the California division—Learcal as it is called now.

Mock himself would be the first to disclaim direct responsibility for Lear's good progress—its net worth has increased 290 times in the last seven years—since he was advanced to the president's chair. This is from no false sense of modesty, but because Mock essentially is a team man. They play together at Lear.

• **Due to the inventive genius** of William P. (Bill) Lear, now chairman of the board and director of research and development, Lear has been chalking up industry "firsts" ever since the company was founded in a small section of loft space in Chicago back in 1930. It still is. Its "ARCON" yaw stability augmenter for light aircraft, using etched circuits and magnetic amplifiers, is an example. It is expected to be one of the greater contributions to safety in the field of private flying.

But while there was no question about Lear's ingenuity, there was about its ability to produce. Lear wasn't entirely unique in this respect. Others in the aircraft industry have had their troubles moving products out the back door.

The story is different now. Lear not only has established a reputation of being able to produce, but it is becoming known as a low cost producer.

A few figures will illustrate results from management planning and control policies introduced by Mock. In 1948, the year he became president, Lear employment was down to 780 from a wartime peak of about 3,500. Today, from the impact of Korea and the addition of new products, the company has approximately 4,000 employes.

Here is the way sales and net worth have increased in the last seven years:

	SALES	NET WORTH
1948	$ 5,340,738	$2,814,891
1949	7,368,753	3,546,950
1950	7,937,937	3,432,304
1951	21,227,093	4,235,387
1952	43,575,980	5,015,035
1953	50,833,910	6,199,230
1954	54,220,637	8,153,355

There is more to last year's gain than meets the eye, because unit selling prices were lower, particularly in the last half. This means substantially more units had to be shipped to attain a higher dollar volume than in 1953.

• **Says Mock** on production costs: "We haven't scratched the surface on what we of the aircraft industry can achieve."

RICHARD M. MOCK

The Lear management began to drive at production costs when it tried to analyze why consumer products in general could sell at 1/10th to ⅕th the prices of aircraft products. A door latch for an automobile might cost $1.50. For an airplane, it would be $15 or more.

Mock pretends no magic in his processes. They are conventional enough. But they're modern, up-to-date. One of his associates explains it this way: "Mock has vision, but he always remembers that two and two make four."

It is characteristic of Dick Mock—a planner—that he "tried out" the aviation business before he definitely picked it for a career. Between school years at New York University, he took a summer job with the Loening Aeronautical Engineering Corp. (where a chap named Leroy Grumman was factory superintendent) to see if it was the sort of work he'd like. Fortunately for Lear, as it eventually turned out, the Loening factory had its interesting aspects for the young undergraduate.

Mock went on to earn his mechanical engineering degree in the first class of the Guggenheim School of Aeronautics at NYU, being graduated in 1927, the year Lindbergh put aviation into the headlines with his historic Paris flight.

• **Planner Mock emerged** from the classroom with a sheepskin in his hand and a plan for a career in his head. He told his father: "I'm going to have five jobs in five years and the fifth one I'll keep." Almost worked out that way, too. He stayed on the 4th job—assistant to the late Tony Fokker for 10 years—but the 5th is still the one he figures to keep. He has it now.

There was no crying demand for engineers in 1927 as there is in 1955 and young Mock may have been a bit dubious as he filed 13 applications for a job. The year before, not one graduate in the class of 1926 had succeeded in landing a job in aviation, and only one had been able to latch onto an engineering job of any kind.

He Selects Edo

But Lindbergh made the difference. All 13 companies came up with job offers ranging from $35 to $45 a week, leaving young Mock quite bewildered by it all. So, of course, he took still another job—with Earl Osborn, now chairman of the Edo Corp., then publishing Aviation Magazine. He had been a free lance contributor to the magazine while in school and he also had done some leg work for Lester Gardner; then editor Osborn was shorthanded and Mock agreed to fill in temporarily as technical editor.

• **His scrapbook** discloses that young Mock was an engineer with solid ideas. One 1927 article advocated gear reduction between engine and propeller. Another article told why landing gears should retract.

Mock gave up his literary venture while it was still in the promising stage to do what he had started out to do in the first place. He launched his aircraft engineering career by joining G. M. Bellanca and at 23 became the first project engineer on the Bellanca Aircraft Corp.'s Pacemaker.

Whether it was actually by design or coincidence, Mock conformed strictly to schedule—first in the world of letters, then at Bellanca. One year each. The pattern was retained in a year with the Heinkel Aircraft Co. in Germany. But this led to Mock's association with Fokker.

• **During the 30s,** the Dutch Fokker company acted as distributor for the Douglas Aircraft Co. in Europe. Mock became Fokker's technical representative at Santa Monica in 1931. The DC-2 and the DC-3 were good sellers and, counted in terms of those days, business was good. Fokker sold 104 planes for Douglas and Mock handled acceptance of every one.

Fokker died in 1939. Holland was invaded. Mock's No. 4 job was phasing out. He looked around and in 1940 he signed up with Lear, which then was in the radio business, but wanted to make actuators.

Starting as Learcal's sales manager, Mock soon became manager of the division and in 1941 a vice president of the company. With Lear's expansion into the electro-mechanical field during the war, Mock was called back to Ohio to take over as chief engineer. When Lear moved its administrative headquarters and most of its activities to its present Grand Rapids, Mich., plant he became manager of the electro-mechanical division. In June of 1947, he was made executive vice president of the company and a little more than a year later, in September 1948, president.

• **Before instituting** the administrative policy he calls "management by exception," Mock discovered he was spending 80% of his time finding out what was wrong and 20% working out the fixes. Now the percentages just about reverse themselves.

And how does "management by exception" conserve an executive's time? By devoting more time in the first place to such matters as an overall work schedule, the preparation of a sales goal, a technical development, a shop standard in terms of manufacturing labor hours, a procurement-cost standard. Reports of results compare actual results with the goal or budget. Facts come out automatically. Management is alerted whenever a goal, achievement or standard is now not met or expected to be met.

Lear's Budgets and Forecasts

Accurate planning spells efficiency, low costs, and avoids "surprises." "An ultra-conservative goal, easy to reach, is no achievement," Mock says.

• **Lear prepares** 5- and 10-year programs of product development, sales, facilities and financial requirements. They are reduced to the form of budgets and forecasts with an increasing amount of detail and an increasing amount of control-point checking for periods in the immediate future. They also are flexible, allowing for a variation in the plans for manpower, expenditures and so on, whenever there is a major variation from the planned or indicated achievements in sales, technical developments, etc.

"Because we have so many opportunities, and because we are constantly working on new product developments that take one to four years or more before they bring a return, it is necessary to review these constantly, both individually and in total, to be sure that they do not siphon off too much working capital, or unduly increase expenses, and that the proper support is given to the right ones," Mock explained.

Lear's cost reduction program embodies restudy of all designs as affecting manufacturing costs and production tooling methods and processes, as well as overall procedures, application of indirect labor and the like. Lear keeps spending more money on tooling. "Ninety per cent of the cost is established in the first layout of a product," said Mock.

• **Mock devotes** a great deal of time to the people in the Lear organization. Himself an engineer, Mock reflects the engineering spirit which predominates. Because it is progressive in technical developments, engineers like to work for Lear, he points out. This helps particularly in areas where expansion is paced by the rate of acquiring skilled technical people.

A great believer in incentive, Mock feels that not enough recognition is given to manufacturers who reduce costs and, in turn, not enough recognition is given to employes who accomplish superior results.

He would like to see the military services work out an incentive arrangement to reward manufacturers for devising methods to accomplish savings in those man hours requiring extensive technical experience.

• **Lear practices** what Mock preaches on incentive. Stock option and bonus plans help attract and retain key personnel. In 1954, 442 employes received awards under the company's incentive bonus plan.

"We say we make animated hardware," says Mock by way of explaining the wide variety of products produced by Lear at Grand Rapids, Elyria, O., and Santa Monica. Its line of automatic flight controls ranges from the L-2 autopilot for light planes to the new L-10 system developed for supersonic aircraft. It was an autopilot, the F-5, that won for Lear the Collier Trophy because of its contribution to the effectiveness of North American Aviation's F-86.

Its VGI (vertical gyro indicator) is the only pictorial attitude indicator in production and its stability augmenters (yaw dampers) are taming oscillations in high-performance military aircraft and helping to provide spiral stability in light utility planes. Its Lear-Romec division is a specialist in the design and manufacture of aircraft pumps.

• **Lear's biggest customer,** of course, is Uncle Sam. But in the background of almost everything that happens at Lear is the business flyer. Lear started out in the aircraft business by producing a lightweight radio receiver for private flyers. Ever since then it's kept the personal and business flyer in mind and has been turning out gadgets to help make his vocation both easier and safer.

"The business aircraft phase is the most neglected part of our industry," said Mock.

This explains Lear's newest division, the Aircraft Engineering division, organized for the modification and remanufacture of aircraft for military and commercial executive use. Currently, it is mainly concerned with the high-speed, long-range modified version of the Lockheed Lodestar which it calls the Learstar. But it is interested in all phases of aeronautical engineering and embodies plans for wide expansion.

He says, at 49, he would make the same decision he made at 21, in choosing his profession.

"I'm enthusiastic about the aircraft business; I find it very encouraging," he declared. • • •

U.S. AIR FORCE
7171
FT-171

THIS ALL-MAGNESIUM version of Lockheed F-80 built by East Coast Aeronautics Corp. of Pelham Manor, N. Y. made its first test flight recently at Mitchel Air Force Base, N. Y. Model is designated F-80C and was developed for USAF Air Research & Development Command over a 10-year period at a cost of $1,750,000. It is slated for further tests at Wright Air Development Center starting this month.

NAA F-86H can double as a fighter-bomber or air-superiority fighter, has "special weapons" capability.

Nellis Air Force Base reports:

"G.E.-POWERED F-86H HAS CLIMB RATE DOUBLE THAT OF THE F-86F"

Newest J73 jet engines have 50% more power in same frame size as J47 models

Just how fast the F-86H Sabre can climb was, until recently, undisclosed. But at Nellis AFB last January, the true potential of Tactical Air Command's "H" Sabre and its G-E J73 engine was revealed. An Air Force report stated:

"To compare the climb rate of the new *F-86H* (J73-GE-3 engine) with that of the *F-86F* (J47-GE-27 engine), we began by flying the 'H' at 3000 feet and an F-86F at 20,000 feet . . .

"Both planes were put into 'maximum climb' simultaneously. At 38,000 feet, the F-86H overtook and passed the 'F'. When the 'F' reached 39,000, the 'H' was at 40,000. At the end of the test, the 'H' was climbing at twice the rate of the 'F'. All told, the F-86H went up 37,000 feet in the same time it took the 'F' to travel 19,000!"

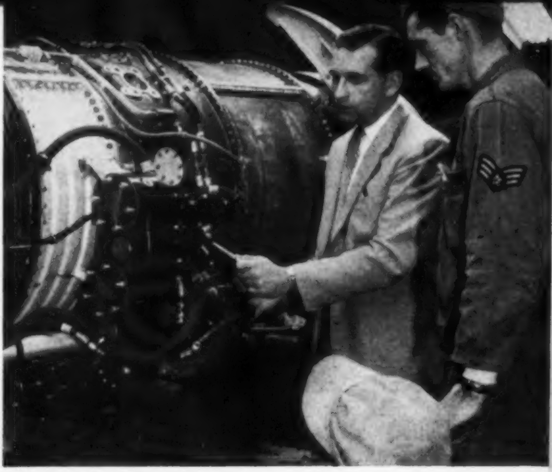
News? Yes—but not to North American Aviation and General Electric jet engineers. The 9000-lb thrust J73, 50% more powerful than the combat-proved J47, promises well as an operational F-86H engine. F-86H take-off distances are less; shorter runways can be used; all-around performance is improved over previous Sabre models.

General Electric progress in jet engine design is *continuous*. It is now—today—paying off in another advanced high-thrust engine, soon to power supersonic military aircraft. 232-7

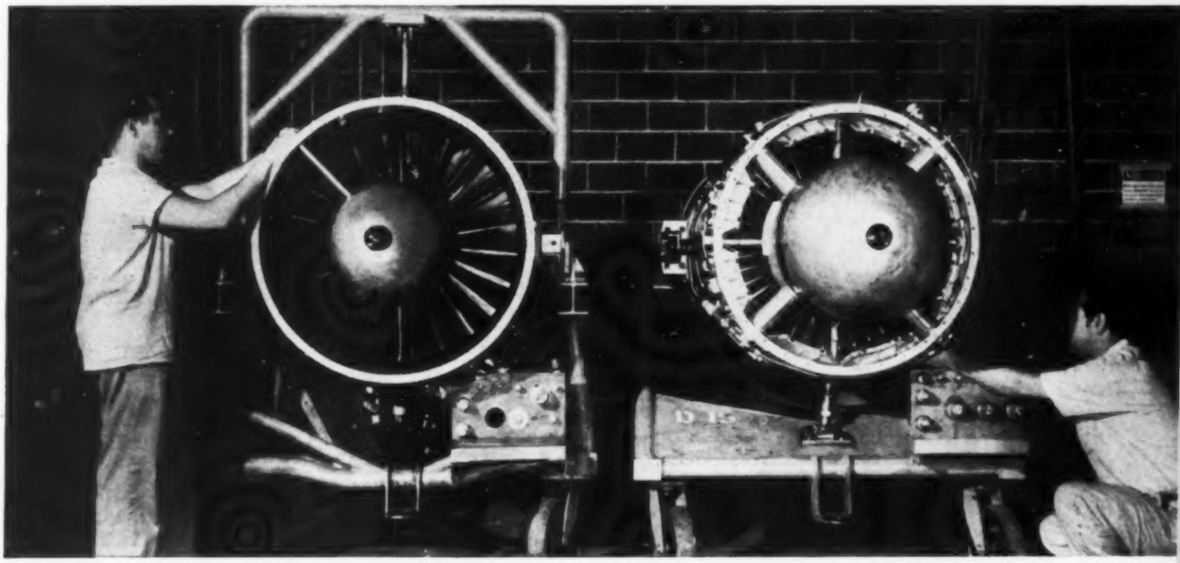
Progress Is Our Most Important Product

GENERAL ELECTRIC

J73 CANNULAR COMBUSTION SYSTEM is significant advance from J47's. It increases burning efficiency and structural rigidity, while saving weight.



J73 ACCESSORIES—To simplify inspection and maintenance, J73 fuel pump, and gear assemblies are mounted beneath engine.



J73 FRONTAL AREA. Diameter of J73 (left) and J47 is about the same, but J73 has greater air intake area which allows more airflow through engine. Exposed J73 inlet surfaces are anti-iced.

OPERATIONAL SERVICE TESTS on G-E J73's show high reliability, low maintenance equal to G.E.'s famous combat-proved J47. J73 engines are rapidly accumulating flight time in the NAA F-86H.

RACER: All-Points Method of Component Evaluation

Proposed Rating System Selects Candidate Components

By HENRY P. STEIER

There is need for a quantitative method of choosing between electronic components for specific applications. Candidate components which perform the same functions but behave differently are becoming more numerous as electronics science continues to advance rapidly. The problem of choice has stimulated conception of evaluation criteria in a rating system called RACER.

Believing that the rapid growth of the electronics industry has outdistanced the supply of experienced engineers who can supply intuitive answers to component choice, James J. Lamb of Remington Rand Inc. (now Sperry Rand Corp.) Laboratory for Advanced Research recently described how RACER is being used as a solution.

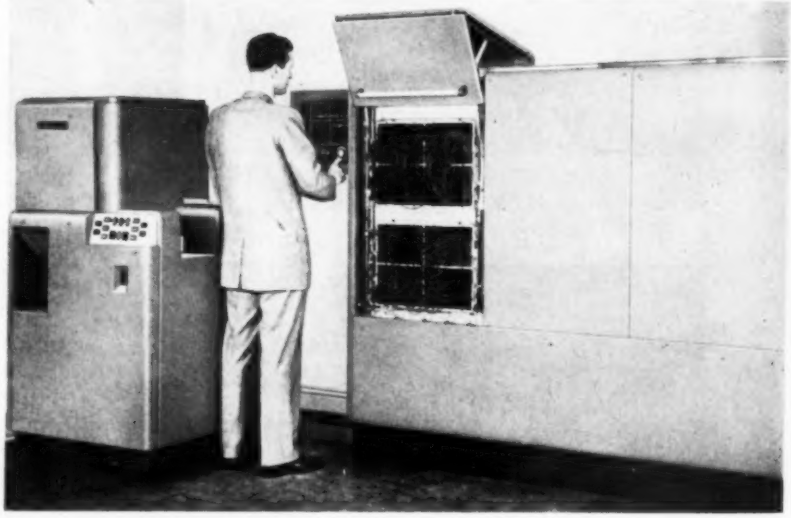
Although Lamb commended the system to young engineers for further development, he believes even the intuitive decisions based on individual experience need a set of criteria for formulation. Systematic evaluations such as RACER are being developed in the business field for product "fit" in product diversification programs, and in the new field of *Operations Research*. Backed by colleagues on the Joint Electron Tube Engineering Council, Lamb has been developing and applying the RACER idea to components for three years.

- **Proposed criteria** for the selection of components and devices are: Reliability, Availability, Compatability, Economy and Reproducibility, whose initial letters form the acronym RACER. By evaluating the relative importance of every criteria, the rating system gives a numerical result in percentile grade.

- **Every criterion** has a positive and negative quality. For reliability it is survival versus failure; availability is plenty versus scarcity; compatibility is efficiency versus compromise; economy is profit versus loss; reproducibility is interchangeability versus selection.

- **An engineer** in selecting a component by means of RACER, should, according to its proponent, ask questions inherent in the definitions given for every criterion:

Reliability is the probability of a given performance, under a given range of conditions, for a prescribed economic lifetime (ELT). Measurement is in terms of proportionate survival.



UNIVAC 120 ELECTRONIC COMPUTER for scientific mathematics and business record-keeping is an end product example of electronic circuitry to which RACER ratings were applied.

Availability is the typical adaptability for efficient operation with companion components and devices in the same circuit measured in terms of inherent characteristics and mutual environmental effects.

Compatibility is the typical adaptability for efficient operation with companion components and devices in the same circuit measured in terms of both inherent characteristics and mutual environmental effects.

Economy is the reciprocal of relative total unit cost that includes purchase price, handling, maintenance and depreciation for a stipulated ELT, with due consideration for both fiscal and physical factors; the evaluation to be expressed in terms of relative total cost for competitive units.

Reproducibility is the degree of uniformity in manufacture, including bonus factors for applicable quality control and with penalties for lack of control of essential characteristics and for necessary selection.

- **A particular case** example, showing the mutual interdependence of the criteria, and one which led to the further development of RACER, shows how reliability is affected by compatibility in a direct manner, and indirectly affects other criteria.

Given was the instance of pulse operation with germanium diodes in DC switching circuits connected to provide high-impedance loading of electron tubes. The tubes were naturally high-impedance generators and typically voltage-operated, and the crystal diodes characteristically low-impedance devices current-operated.

The high back resistance demanded of the diodes strained their reliability characteristic and hence availability. Economy was affected by poor reproducibility that forced selection to obtain high back resistance. An alternative was low resistance plate loading, with reduced efficiency, requiring a power tube. Then impedance matching by pulse transformers becomes necessary and hence lessened economy, together with a different circuit design. This problem showed that compatibility is a prime attribute among the five criteria of RACER.

- After categories of evaluation are established, a number of grades in each category are established. These grades range from excellent to poor, with quality points, from 5 for excellent to 1 for poor, assigned.

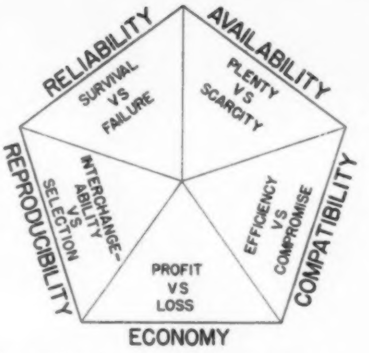
A weighting factor of four, for example, shows how a maximum percentile rating of 20 for each criterion give a possible total of 100 for the five. Military or airline equipment applications of RACER would probably put a greater weighting factor on criteria such as reliability and proportionately less on economy. A permanent component might have an ELT of 10 years, or a guided missile component a few minutes. However, "dollar discipline" in military circles is seriously regarded today and would have some effect on the cost parameter of the economy criterion.

- Said to be essential prerequisites of the RACER procedure are realistic determinatons of detailed operatng service requirements and components specifications. For example, expensive premium electron tube types with a high survival of 50,000 hours might be outrated by a lower quality type with 5,000-hour survival if fiscal costing is set up on a basic five-year schedule for the end product, but on the basis of 100 per cent annual tube replacement.

- To give an idea of the end product of one RACER application, a case involving the Univac 120 Electronic Computer was cited. It involved a choice between a solid state and gaseous conduction tube for a DC switching application in 40 IC repetition rate computer circuitry involving production of thousands of assembly units per week.

Candidate devices, called X and Y, were required for an ELT of 12,000 hours. Ninety-seven per cent survival for the Y device, the gaseous tube, gave it a percentile rating of 20.

Availability for X was 100 per cent, rating 20. Y, requiring critical nickel, but available 100 per cent from only one source, got a 12 percentile rating.



FIVE "FACES" of RACER evaluation form a pentagon of interdependent criteria.

On compatibility, X rated 8 since it required compromise in circuit design because of strained characteristics. Y rated 20.

Cost factor for X was 1.0 and rated 20. Y cost factor was 0.68 and rated 14.

Reproducibility of X was such that some selection was necessary, but it had practical interchangeability and rated 6. Y rated 20.

The summary of percentile rating shows 70 for X and 86 for Y. Reliability experience with the Y tube has been borne out with 13,000 hours operation for one machine, with 10 failures among 1,200 installed units in the machine.

- Initially, RACER can serve as a check list for qualitative trial evaluations, and with further formulation of quantitative techniques and application of more rigorous statistical analysis it offers the possibility of being a fully sophisticated answer to currently strained judgment of component choice.

Quality	Quality Points	Weight Factor	Percentile Grade
Excellent	5	4	20
Very Good	4	4	16
Good	3	4	12
Fair	2	4	8
Poor	1	4	4
Failure	0	4	0

Every criterion in the RACER rating system has five possible acceptance qualities. Different weighting factors would be applied depending upon the product application.

	Percentile Rating	
Criterion	Solid State Device-X	Gaseous Tube Device-Y
Reliability	16	20
Availability	20	12
Compatibility	8	20
Economy	20	14
Reproducibility	6	20
Total %	70	86

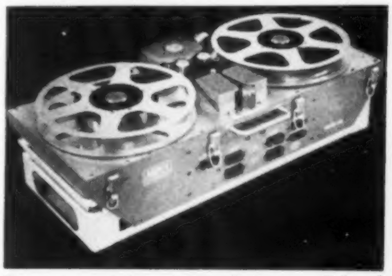
A RACER rating summary that decided in favor of using a gas conduction tube for a computer application.

Recorder Aids Testing Of Piloted Aircraft

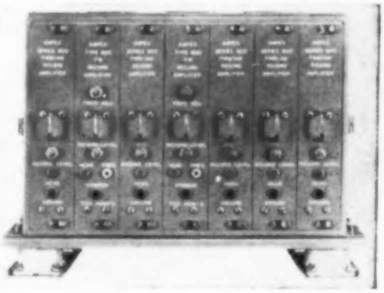
The great impetus given to development of highspeed, ruggedized telemetering techniques through missile research and development is finding application in the field of piloted aircraft.

Flight test data acquisition is being increasingly aided by using airborne telemetric receiving stations carried by a mother ship operating with the aircraft under test. Pilots of manned aircraft are relieved of the task of visual observation of complex data, but are on hand to make major decisions in the test flight.

Among the advantages of air-to-air links in preference to ground-to-air links are the flexibility of test area choice and extension of the "line-of-sight" range over which tests can be conducted in the 200 mc frequency region where most telemetering is done.



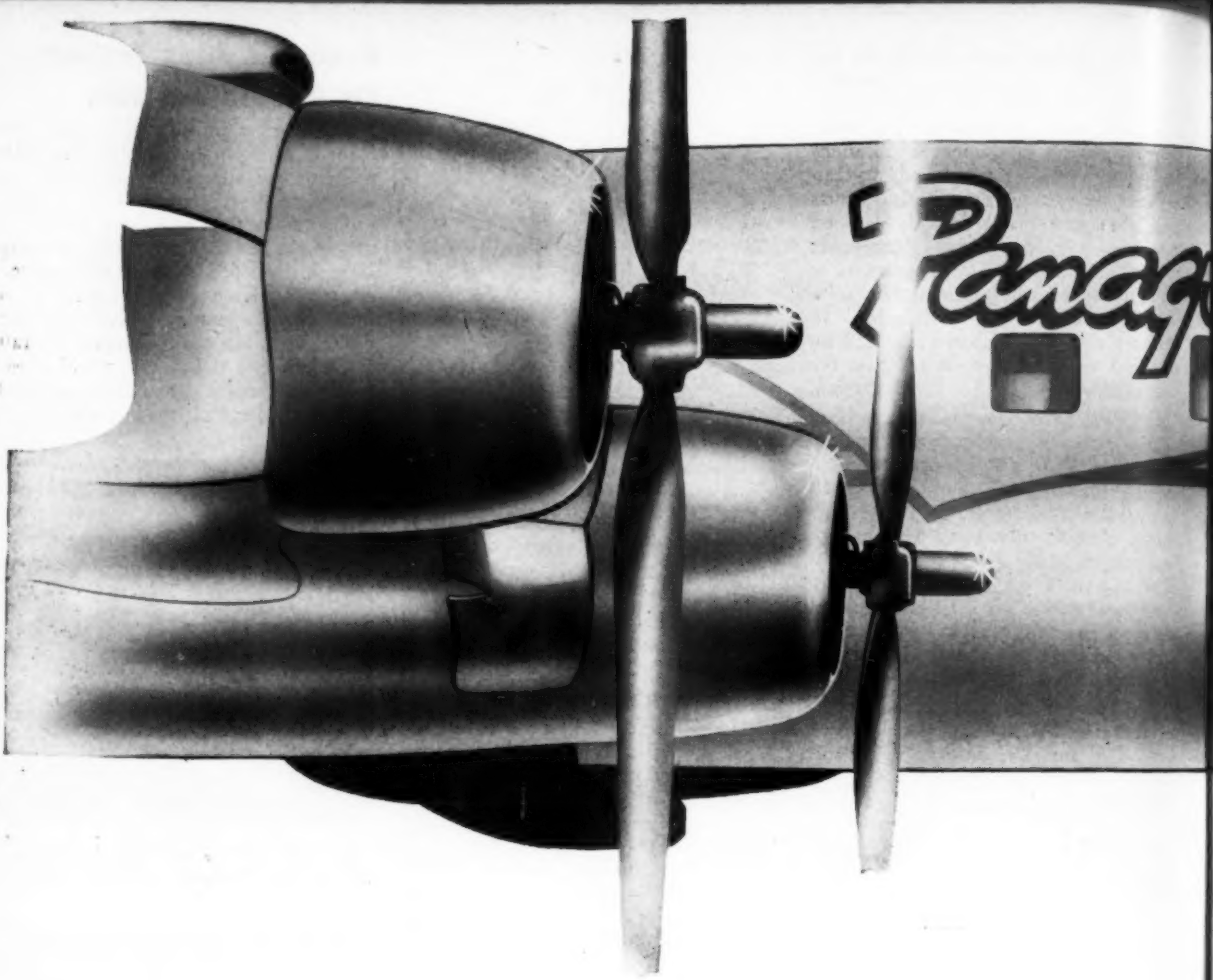
Tape transport unit employing a "closed loop" tape path for reduced flutter and wow, and (below) pluggable amplified rack for a seven-channel system.



Size and weight limitations imposed upon airborne recording equipment should be aided by the new Ampex Corp. airborne high altitude magnetic tape and amplifier equipment designed to permit recording from 1 to 28 channels.

Direct, FM-carrier, or pulse-width modulation data can be accommodated in the new equipment by a flexible system of plug-in amplifiers that may be used in combination to satisfy most flight test requirements.

Designed to operate up to 50,000 feet, between —65F and +130F at relative humidity of 100 per cent at 122F, the equipment for seven channels of information weighs 88.5 pounds.



BENDIX

AIRBORNE RADAR

AIR COMMUNICATIONS AND NAVIGATION EQUIPMENT • AIR DEFENSE RADAR • GROUND CONTROLLED APPROACH AIRCRAFT LANDING SYSTEMS

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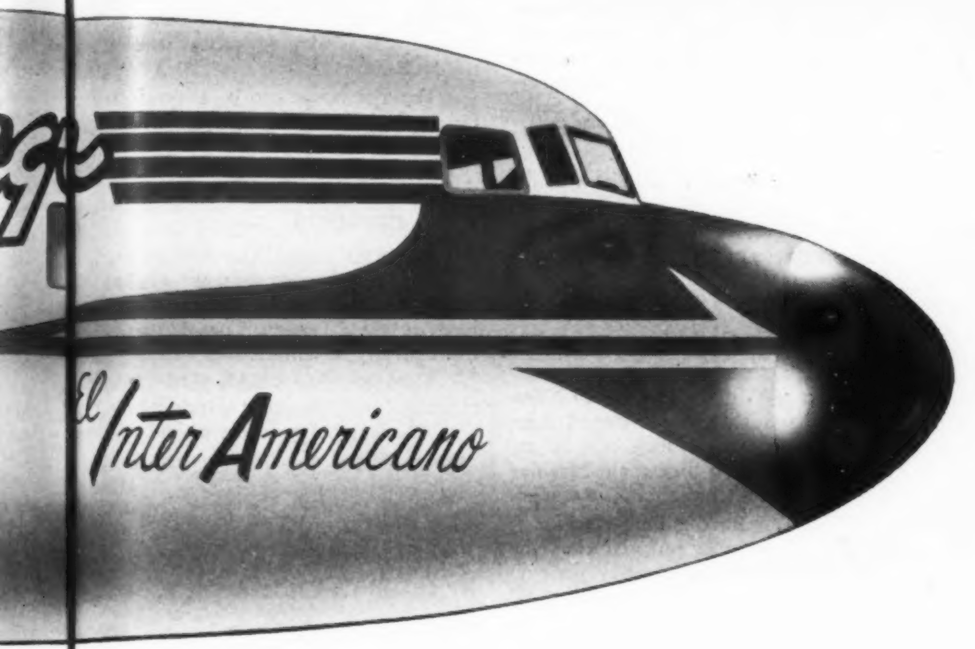

World's first airline to use airborne radar

in scheduled flight... *and the radar is by Bendix!*

Panagra is using, on scheduled flights of its new DC-7 fleet, the latest major contribution to safe, more comfortable commercial aviation . . . Bendix* Airborne Radar. It's Bendix Airborne Radar that gives Panagra pilots a long distance, all seeing, extra "eye" for avoiding turbulence. This radar is also used for terrain mapping and navigation.

Storm Avoidance

Bendix Radar detects and sees through turbulence up to 150-miles away . . . even at night or under instrument conditions. It penetrates heavy rainfall and reveals smooth corridors through apparently solid storm areas. The naked eye can't see the quiet paths . . . but radar can.

With a slight detour from track, at cruise powers, storm avoidance means improved flight schedules . . . minimized flight course detours, few flight cancellations, more completed flights.

Now Panagra passengers will enjoy smoother flying . . . greater comfort . . . guided through turbulent areas by Bendix Radar behind the radome . . . soon to become the most famous nose in aviation.

"C" and "X" Band Radar

Bendix is *the only* manufacturer offering both C and X band radar. Send for free illustrated Bendix booklet, "Airborne Storm Avoidance Radar Systems."

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*Reg. U.S. Pat. Off.

Circle No. 15 on Reader Service Card.

New Products and Processes

NON-ADHESIVE TAPE

W. S. Shamban Co. is producing Kelon-T (Teflon) tape in widths up to 24 inches for aircraft, hydraulic and general industrial use. The 24-inch wide tape comes in thicknesses ranging from 0.005″ to 0.125″ and is believed to be the widest continuous lengths available in quantity.

Kelon-T tape is non-adhesive, chemically inert, has excellent electrical properties and resists abrasion and corrosive chemicals at high and low temperatures. It fits tightly over sharp bends and corners and has the property of "plastic memory," tending to return to its original shape when heated.

Circle No. 150 on Reader Service Card.

PORTABLE OIL UNIT

The Harmeco portable hydraulic oil unit, made by Harman Equipment Co., is designed for the servicing of aircraft hydraulic systems and for general hydraulic oil transfer. It also handles petroleum and synthetic jet engine oil.

Equipped with a lever-operating diaphragm pump, the unit is said to be capable of producing a very high vacuum to deliver oil at the rate of approximately 10 gpm. Standard filter element strips water and removes solids down to 10 microns. A special filter equipped with elements suitable for restraining solids from 2 to 40 microns is available when specified. Included in the unit are a 10-ft. length of delivery hose with self-closing nozzle, the necessary quick couplings and a canvas cover to protect the equipment when not in use.

Circle No. 155 on Reader Service Card.

LINEAR ACTUATORS

Two new series of "thin-package" linear actuators have been announced by Lear, Inc., completing coverage of the 0 to 7,000 pounds operating-load range and making a Lear thin-envelope type actuation device available for virtually every type of missile and jet aircraft requirement. They are designated Series Nos. 434 and 435. The previously announced series was No. 413.

The family of new units was developed, it was explained, to meet severe limitations on component space anticipated by the company on most future actuator installations.

Circle No. 151 on Reader Service Card.

MACHINE TOOLS

Pratt & Whitney Division of Niles-Bement-Pond Co. has developed three new machine tools which will be exhibited for the first time at the Machine Tool Show in Chicago in September.

The Velvetrace milling machine is said to be capable of producing the finest details of virtually any three-dimensional model (within its 12″ x 9″ work capacity) to an accuracy previously not obtainable.

The company's new vertical precision hole grinder, designated the No. 2E, is designed to grind straight or tapered holes with extreme accuracy in size and position in a fast, easy operation. Grinding speeds range from 4,000 to 100,000 rpm. The No. 2E grinder differs from conventional grinders in that the work is strapped to a table (working surface 22″ x 44″) and does not revolve.

Pratt & Whitney Division also has developed a new model BL Keller tracer-controlled milling machine, designated the BL 3622, Model C. The new model is heavier and more rugged than previous models, being designed to accommodate larger and heavier work. Spindle power has been increased to 10 hp, producing greater metal removing capacity.

Circle No. 152 on Reader Service Card.

LENS CHECKING INSTRUMENT

A measuring instrument for checking aerial camera focus and lens collimation is being produced by Gordon Enterprises under contract with the U.S. Air Force. Called a Focalscope, the instrument measures the position of the lens in relation to the film plane, to check focus, and is also used as an autocollimator. It may be used by camera repair technicians when making installations, or by aerial cameramen during actual flight. It contains a low-powered microscope on which verniers are mounted.

When used as an autocollimator, the Focalscope's self-contained light source is projected from the instrument through the camera body and lens and reflected back into the eyepiece. The lens, in this application, acts as its own collimator.

The Focalscope can be adapted for use on both 9 in. x 9 in. and 9 in. x 18 in. film sizes.

Circle No. 153 on Reader Service Card.

TOOL GRINDERS

Ex-Cell-O Corp. has developed a complete new line of tool grinders which will be displayed for the first time at the Machine Tool Show in Chicago in September.

There are four models in the line, ranging from precision grinders with 6-in. wheels to heavy-duty machines with 14-in. wheels. All are double-end models with reversible motors. Grinding is done on the faces of plate-mounted wheels.

Style 44-A is especially suitable for sharpening carbide tools with diamond wheels. The largest model is Style 49-A, suitable for rough grinding of all sizes of tools.

Circle No. 158 on Reader Service Card.

MIDGET THERMOSTATS

Fenwal Inc. has developed a new line of midget thermostats, ¼-in. in diameter and less than 2½ in. long, weighing approximately one ounce. They are designed for precise temperature control or heat detection applications in heated equipment, bearings, pumps and wherever installation space is at a premium.

The midget Thermoswitch may be set to actuate at any specified temperature between minus 50° and 500° F. Contacts open when the temperature exceeds the set point. Inverse action models, in which contacts close above set points, are also available.

Circle No. 156 on Reader Service Card.

MAINTENANCE STAND

Machine Screw Products Co. has delivered a new adjustable maintenance stand, weighing 6,100 pounds, to Elgin Air Base, Fla. An undisclosed number of the stands were produced on subcontract with Boeing.

The structures, called empennage stands, are designed primarily for work on high tails of Air Force bombers, such as those of the eight-jet B-52, which stands as high as the average four-story building. A fixed section carries a stairway 23 feet up from the ground. A movable second section extends the stand to a height of 43 feet.

Circle No. 157 on Reader Service Card.

ADHESIVE FILM

Rubber & Asbestos Corp. has announced a new metal-to-metal (or to rigid plastics) adhesive in film form supported on a glass reinforcing mat, called Plymaster V-2. Strengths of up to 40 lbs. per inch in peel, accompanied by tensile shear strengths of more than 2,000 psi, can be obtained with this adhesive, according to the manufacturer.

Although it was originally developed for use as a latent adhesive for bonding metal skins to paper or to metal honeycomb cores in "sandwich" construction, Plymaster V-2 is said to be suitable for a wide range of other flat surface bonding operations.

Circle No. 160 on Reader Service Card.

ROTARY ACTUATOR

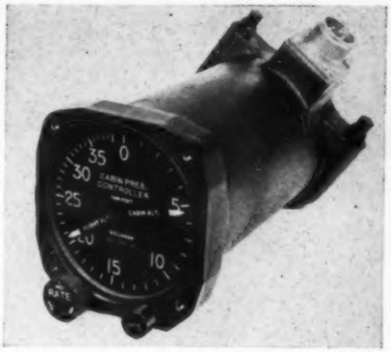
Lear Inc. has developed a 10-lb. rotary actuator for aircraft capable of handling of ultimate loads up to 17,000 in.-lbs and maximum operating loads up to 12,000 in.-lbs. Designated as Series 249, the new unit is said to be one of the lightest and most compact yet designed for any given mechanical output.

Envelope size of the largest actuator in the series measures approximately 3¾ in. x 6¼ in. A wide output range is made available by using interchangeable gear stages. Gear ratios range from 4.8:1 to 7,500,000:1.

Circle No. 162 on Reader Service Card.

PRESSURE CONTROL SYSTEM

Kollsman Instrument Corp. is making a new cabin pressure control system which will be standard equipment on the Douglas DC-7C airliner and is said to provide greater passenger comfort. It incorporates an electric system with only two manual controls, one to set the desired cabin altitude, the other



Curious? MOODBEAMS #7

Being curious about a fizzing firecracker is comparable, say, to NOT being curious about the condition of metal fuel tanks in an airplane. On the one hand, Hope Frarer (24, 5' 5", 118 lbs., blue eyes, blonde hair) may get the lipstick blasted right off that pretty, perky face of hers.

On the other hand, a pilot with a leaky gas tank may — well-IIHI, you know!

If you aren't sure about your tanks, we urge you to get curious NOW, and let us remove, clean, inspect, and repair them; slush them with a protective compound, and reinstall them in apple-pie order. In any event, this should be done every thousand hours or two years.

Southwest Airmotive COMPANY
LOVE FIELD ☆ DALLAS

Circle No. 16 on Reader Service Card.

NEW GIANT OF THE
INDUSTRIAL SOUTH
PRODUCES MIGHTY AIR
FORCE CARGO PLANE

USAF C-130

U.S. AIR FORCE

FIRST TURBO-PROP TRANSPORT FOR MILITARY AIR POW

0 HERCULES

This is the C-130 Hercules, a new Air Force combat cargo plane now in production at Government Aircraft Plant No. 6 (GAP-6) in Marietta, Georgia.

You're going to hear a lot about this plane. The Hercules was designed to function in the new atomic era as a highly mobile, high-speed transport, able to rush men and materiel to vital areas *at less cost*.

The C-130 is the result of a new Air Force-Lockheed concept of tactical mobility. It was engineered specifically to solve problems of loading, unloading, on-board handling, airport limitations and operating costs.

The low fuselage floor, 41 inches off the ground, provides truck-bed loading, while the adjustable tail ramp also permits vehicles to drive directly aboard. And the unique landing gear, combined with the C-130's tremendous power, makes possible short takeoffs and landings even on improvised runways.

Developed for the Tactical Air Command, the Hercules will also drop paratroops and evacuate wounded from forward areas. And its amazingly low operating cost promises greater economy in future peacetime air freight.

POW R PEACETIME AIRLIFT

OCKHEED

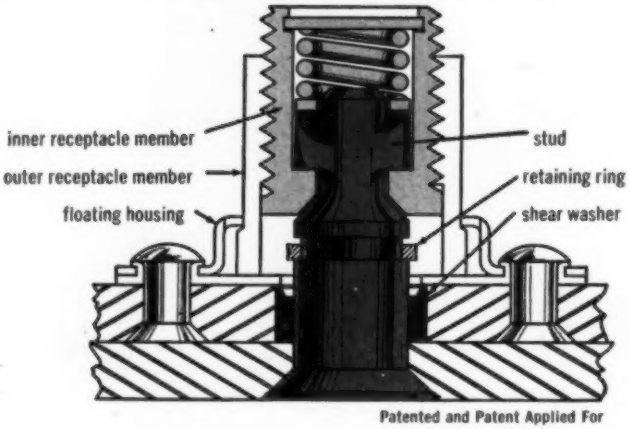
AFT CORP., GEORGIA DIVISION, MARIETTA, GEORGIA

k to Lockheed for Leadership

New
High Performance
Fastener

EXCEEDS ULTIMATE
TENSILE and SHEAR
LOADS OF NAS 547

New PANELOC High Performance Aircraft Fastener Carries Primary Structural Loads in Shear and Tension with Minimum Deflection and Minimum Sheet Separation.



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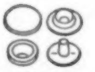
Styles 1 & 2

Style 3

Rotary Latch


Snap Fasteners

Fill in Coupon or Write Letter for Catalogs

PANELOC

Scovill Manufacturing Company, Aircraft Fastener Div.
44 Mill Street, Waterbury 20, Connecticut
Please send me fastener catalogs checked:
( ) High Performance (NAS 547) ( ) Style 3 (MIL-F-5591A)
( ) Styles 1 & 2 (MIL-F-5591A) ( ) Rotary Latch
( ) Snap Fasteners (AN227)
Send to:
Name__________ Title__________
Company__________
Address__________

Circle No. 17 on Reader Service Card.

to fix the rate of pressure change to be maintained while the plane is being brought to the desired altitude. All other operation is automatic.

The heart of the system is the diaphragm-actuated Kollsman pressure monitor. Three of these monitors maintain a relationship between the altitude at which the plane is flying, the pressure within the cabin, and the rate at which the cabin pressure decreases or increases as the plane climbs or lets down.

Circle No. 164 on Reader Service Card.

GAIN-STANDARD ANTENNAS

Parabolas, horns, dipoles and dipole arrays precisely calibrated for gain to 0.2 db are marketed by Color Television

Inc. Various types of antennas for the frequency spectrum of 100 mc to 50,000 mc are available for laboratory use as propagation gain standards.

Circle No. 161 on Reader Service Card.

ILLUMINATED SWITCH

An illuminated pushbutton switch, featuring an indicating light as an integral part of the button itself, has been announced by Micro Switch, a division of Minneapolis-Honeywell Regulator Co. It is designed for use in aircraft, electronic, mobile, marine, railway and other AC or DC applications employing low voltages.

The switch has a socket inside the head of the pushbutton for a single-contact miniature bayonet-mounted lamp. Its catalog list number is 31PB1. Removable translucent pushbutton, keyed to prevent rotation, are available in red or frosted white for use with incandescent bulbs, and in clear plastic for use with No. 51 neon bulbs.

Circle No. 163 on Reader Service Card.

ROTARY LATCH

Scovill Manufacturing Co. has announced a new fastening device, the Paneloc rotary latch, designed for use on hinged or removable parts, such as inspection doors, access panels, covers, electrical control panels, machinery doors, etc.

Made of steel and cadmium plated,

the latch consists of four parts: latch-screw, shim plate, anchor block and latch-nut. The entire latch is assembled on the access panel only, which is said to eliminate several of the operations required to install other types of fasteners. The company says it saves space, weight, time and cost. Operating with a quarter turn, it cuts down removal time of panels, doors and covers. Three standard sizes are currently available. Other sizes are available on special order.

Circle No. 154 on Reader Service Card.

SELF-LOCKING BUSHING

A self-locking, vibration-proof bushing has been developed for use in relatively soft castings, forgings and extrusions—such as aluminum alloy, magnesium, mild steel and some plastics—by the Elastic Stop Nut Corp. of America. It is designed for soft castings of all kinds used in aircraft engines, diesels, automotive and small internal combustion engines. It provides a self-locking blind fastening which adds to the strength and prevents wear and destruction of tapped holes in machine parts.

ESNA Type 2424 bushing is available in two internally self-locking designs, depending upon temperature requirements.

Circle No. 159 on Reader Service Card.

GEAR BOX

New aircraft accessory drive gear box developed by Western Gear for airborne applications is designed for continuous duty operation. Applications of the gear box include use with a hydraulic motor as the power source to drive a-c and d-c alternators. Model 1603 pictured here provides a gear ratio of 1:2.444 between input and output pads.

Circle No. 165 on Reader Service Card.

JET OIL PUMP

New 2¾-pound oil pump for jet engine lubrication has been developed by Lear, Inc. Lear-Romec Division. New pump is a two-element type with each element having a displacement of 0.256 cu. in. per revolution. Rated capacity is 3.2 gallons per minute at 0- to 2-in. hg inlet suction, 50 psi discharge pressure and 3330 rpm.

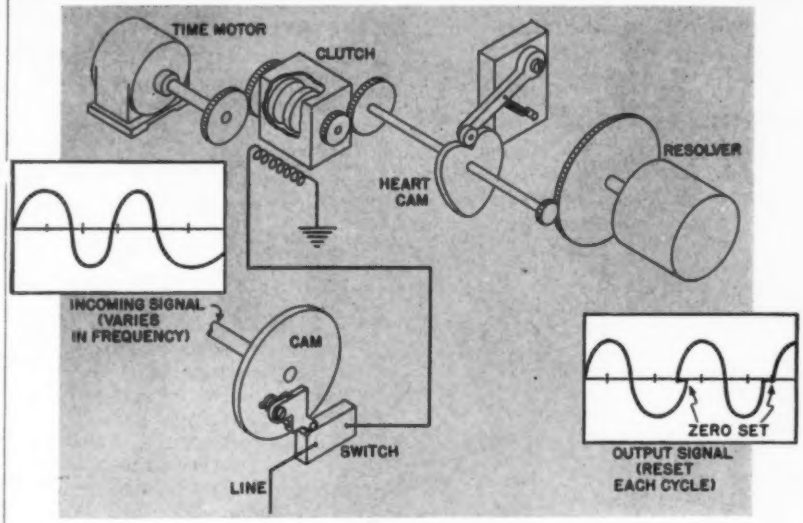
Circle No. 166 on Reader Service Card.

AXIAL FAN

A compact vane axial fan, designed to cool airborne electronic installations, is being made by Ilg Electric Ventilating Co. It is being installed in U.S. Air Force planes, having been designed especially to meet service requirements.

The fan delivers 60 cfm at 5 in. pressure water gauge and 112 cfm at one in. pressure water gauge. It is said to be oilproof and explosion-proof, and

SINCE 1915 LEADERS IN AUTOMATIC CONTROL


TIME MOTOR
CLUTCH
RESOLVER
HEART CAM
INCOMING SIGNAL (VARIES IN FREQUENCY)
CAM
SWITCH
LINE
ZERO SET
OUTPUT SIGNAL (RESET EACH CYCLE)

HOW TO ZERO-SET RANDOM PHASE VARIATIONS

Many modern control devices are designed for applications where sensed input signals fluctuate randomly about an approximately known frequency. In some of these applications, the information is conveyed by the phase relationship within one cycle, and the random cycle-to-cycle phase variations often submerge the signal in noise. Filtering, or averaging, techniques may be extremely difficult to devise because of the requirement for use within one cycle.

The ingenious electro-mechanical solution shown above is a typical Ford answer to a difficult problem. It is rugged and reliable, yet compact and easy to service. In operation, a constant-speed motor drives a resolver at the required speed. The sensed input controls the operation of the clutch, and at each zero-crossing in the positive direction, decouples the motor from the line. At the same time, the spring-loaded heart cam follower resets the synchro shaft to its zero position.

In this manner, the resolver is reset to a prescribed phase relative to the signal at a fixed point of every cycle of the generated signal.

This is another instance of how Ford's engineering staff selects the most efficient device to solve a problem. Here at Ford mechanical *and* electronic devices are given consideration in solving any problem.

Since 1915 the engineers at Ford Instrument Company have specialized in such equipment as computers, controls, and servo-mechanisms in hydraulics, electronics, mechanics and magnetics for the Armed Forces and for industry. If you have problems in any of these fields, it will pay you to discuss them with Ford engineers.

67

FORD INSTRUMENT COMPANY
DIVISION OF SPERRY RAND CORPORATION
31-10 Thomson Avenue, Long Island City 1, N. Y.

ENGINEERS
of unusual abilities can find a future at FORD INSTRUMENT COMPANY. Write for information.

Circle No. 18 on Reader Service Card.

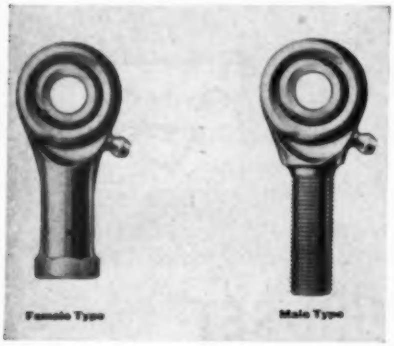
operates either in pressurized or non-pressurized aircraft.

In the exploded view here, the major elements are (left to right): vanes, wheel, housing and motor. The radio interference filter is directly above the housing.

Circle No. 167 on Reader Service Card.

TWO-PIECE ROD ENDS

A new line of spherical bearing rod ends, under the trade name "Spherco," has been announced by Spherical Bearing Corp. Bore sizes range from ⅛ in. through 1¼ in. Three series are offered, Aircraft, Standard and Commercial, differing only in tolerances and materials of construction.



These rod ends, available in both male and female types, feature simplified two-piece construction, with the lubrication fitting an integral part of the rod end member.

Circle No. 168 on Reader Service Card.

MISSILE GYRO

New directional gyroscope developed by Gyromechanisms, Inc. for guided missile applications weighs 5½ lbs. and is rated for 30 g shock and acceleration loads.

The Model 45,000 gyro motor is rated for 1,000-hr. life. Versions of the unit with a-c signal output, and a slightly modified free gyroscope type, are under development.

Circle No. 169 on Reader Service Card.

LIQUID SENSOR

New liquid sensing device marketed by Air Associates, Inc. will detect presence of liquid in 0.4 seconds and absence of liquid in five seconds.

In aircraft fuel systems, it is being used as both a low-level warning device and high-level cut-off switch. It will sequence fuel from one tank to another when a predetermined level is reached, and can operate alarm systems, control pumps, valves or motors in response to a change in liquid level.

New unit consists of an electrically-powered probe containing a small thermistor, a power control package, and interconnecting cable.

Circle No. 171 on Reader Service Card.

TRANSISTORIZED BOOSTER

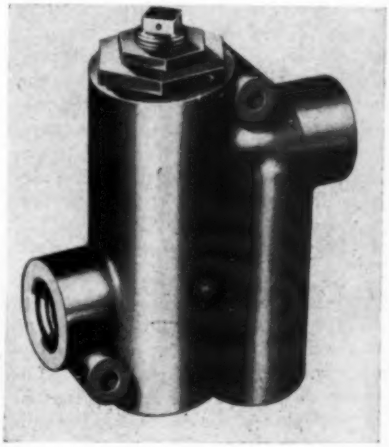
Booster amplifier using transistors provides 10 watts from a 1 watt source. For power gain in public address and intercom audio system, or servo and industrial control systems, the Model 5502 transistorized unit made by Lear, Inc. has input-output impedance of 15 ohms, or other values on special order. Operating from 28 volt dc systems, total weight is 14 ounces. Size is 5 5/16 x 2 3/32 x 1¾.

Circle No. 170 on Reader Service Card.

RELIEF VALVE

A relief valve with a thermal venting feature, which provides a means for controlling maximum system oil temperature as well as maximum system pressure, has been made for aircraft oil-hydraulic systems by Vickers Inc.

Designated Series EA 50004, the compact, lightweight unit is basically a 3000 psi relief valve which includes an integral temperature control element. This control is a safety device which prevents fluid in the working circuit from exceeding a maximum safe operating temperature of 270° F.



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DIGITAL DELAY GENERATOR

New time discrimination instrument for precise measurements in fields

LOW COST... ...LONG SPANS
STEEL HANGARS
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STRUCTURAL STEEL CO.
1700 SAWTELLE BLVD., L.A., CAL.
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LOWEST COST HANGARS OBTAINABLE... QUICKLY ERECTED—LOW MAINTENANCE—OVER 100 INSTALLATIONS THROUGHOUT THE WORLD. DOOR OPENINGS TO 200 FT.—HEIGHTS TO 60 FT.... ONLY ANDERSON HANGARS HAVE THE NEW HIGH-STRENGTH BOLTED-ON RIBBED SHEET. *Call or write now.*

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WORLD'S PREMIER AIRPLANE FABRIC
lighter stronger smoother
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Leading Manufacturers of Fabric and Tapes for the Aircraft Industry
FLIGHTEX FABRIC
Export Representative
AVIQUIPO, Inc.
25 Beaver Street, N. Y.
Cable: Aviquipo

Circle No. 20 on Reader Service Card.

of electronic navigation, digital computers, and nucleonics. Provides pulses, precisely delayed with respect to internally generated pulse at any repetition rate. Accuracies of better than 0.001 μsec in 1000 μsec are claimed by the manufacturer, Kaiser Metal Products, Inc.

Can also be used as source of secondary frequency standards since it gives three thousand crystal controlled frequencies between twenty cycles and one megacycle. Weight is 90 pounds. Cabinet height is 20 inches.

Circle No. 173 on Reader Service Card.

AIRCRAFT PUMPS

Eastern Industries, Inc. has announced new Series 1700 aircraft-type pumps for use in planes and guided missiles as lubricating and fuel pumps. They are also used in hydraulic servo systems.

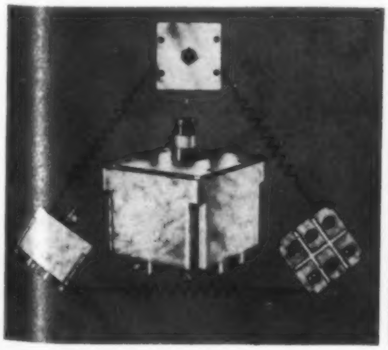
Outstanding feature of the pumps is the fact that they are direct driven. They operate efficiently with motors up to 10,000 rpm. Displacement of the smallest pump in the series is 0.00419 cubic inches per revolution. The largest has a displacement of 0.02514.

These pumps have an aluminum housing, steel gears and shafts, synthetic rubber seals, bronze or carbon bearings.

Circle No. 174 on Reader Service Card.

CIRCUIT BREAKER

Spencer Thermostat Division of Metals & Controls Corp. has announced a new Klixon thermal-type polyphase circuit breaker, D6760, which embodies three electrically separate, high-rupture mechanisms that trip simultaneously,



YOUR EXECUTIVE AIRCRAFT DESERVES THE BEST

ENGINE OVERHAUL

For aircraft engine overhaul service, Pratt & Whitney Aircraft's Airport Department is "home" for many types of business aircraft. Like many of the nation's leading companies, you can enjoy the advantages and reassurances that go with engine work performed at the factory. It can cost less, too, in the long run.

PARTS REPAIR

Certain types of engine parts repair, such as rebarreling cylinders or rematching crankcases, require factory facilities and factory methods that are available to you at the Airport Department. Complete equipment for all possible parts repair jobs—large or small—assures prompt dependable work.

AIRFRAME OVERHAUL

Expanded service hangar facilities can accommodate even the largest commercial aircraft. Service is prompt. Regular work includes inspections, engine changes, radio and instrument repair, airframe repairs or modifications, and general aircraft maintenance.

For further information
on your particular requirement fly to, or write:

PRATT & WHITNEY AIRCRAFT
DIVISION OF UNITED AIRCRAFT CORPORATION
AIRPORT DEPARTMENT

RENTSCHLER AIRPORT EAST HARTFORD, CONNECTICUT

should any of the phases become overloaded.

Features include a single button reset which recloses all three phases simultaneously with one-button manual operation. The Klixon D6760 is available in ratings from three through 35 amperes.

Circle No. 175 on Reader Service Card.

SEALING RINGS

New line of Tetraseal rectangular-section seal rings for static and moving applications has been introduced by Goshen Rubber Co.

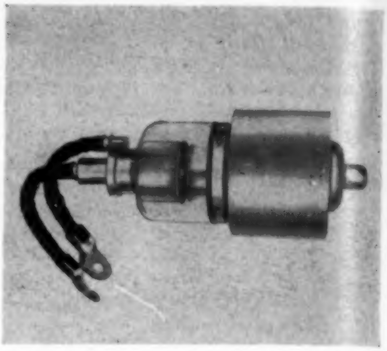
New seals are available in materials meeting MIL, AMS and commercial specifications. Cross-sectional tolerances can be held to ±.004 in. and diametral tolerances to ±.005 in. from ¼-in. OD up to 3½-in. OD; for 3½-in. OD to 8½-in. OD seals, tolerances are ±.088-in.

Circle No. 176 on Reader Service Card.

HIGH VACUUM RECTIFIER

New rectifier for pulse service, voltage multipliers, or special high frequency applications at extreme ambient temperatures. Rated at 3.0 amperes average current at 25,000 volts peak inverse.

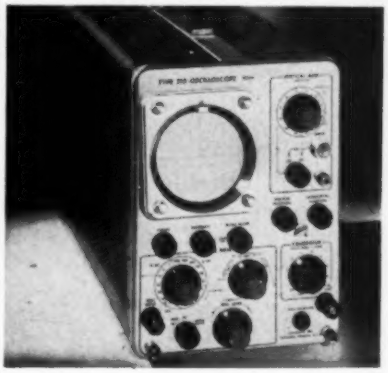
The manufacturer Eitel-McCullough, Inc. claims reliable performance for the tube at high frequencies and high voltages without generating radio frequency transients. Cooling is by forced air on external anode.



Circle No. 177 on Reader Service Card.

PORTABLE OSCILLOSCOPE

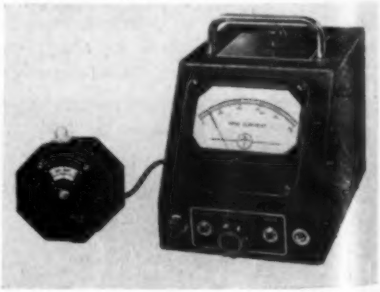
Tektronix Type 310 Oscilloscope is a DC to 4 mc instrument featuring: Wide range sweep circuit-0.5 µsec/div to 0.2 sec/div; vertical amplifier rise time 0.09 µsec; square-wave voltage calibrator; 5x magnifier; calibrated sensitivity from 0.1 v/div to 50 v/div in 9 steps at DC to 4mc. Size—10″ high x 6¾″ wide x 17″ deep.



Circle No. 178 on Reader Service Card.

UHF GRID-DIP OSCILLATOR

New instrument covers range of 430 to 940 mc. Ocillator output is either CW or 120-cycle modulated. Linear calibration is provided with a calibration point every 10 mc. Size—2½″ deep x 4⅜″ wide. Case has standard camera socket for tripod mounting. Produced by Measurements Corp.



Circle No. 179 on Reader Service Card.

BRIDGING THE ATLANTIC WITH *PAA*

AER-O-COM

HF airborne radio equipment

Congratulations to PAA on its 50,000th "milestone" Atlantic crossing and on the inauguration of its "Super-7" Clipper Service!

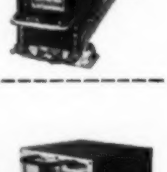
To assure dependable communication for its flights between the U.S. and Europe, PAA uses dual installations of this Aer-O-Com equipment:

Model AT-144 Airborne Transmitter:

Frequency range 1.6 - 1.75 and 2.0-22.0 mcs. covering 144 independent crystal controlled frequencies. Weight 44 lbs. Separate transmitter and receiver permit crossband operation.

Model DPU Power Unit:

Proven dynamotor type, 33 lbs.



Model AR-144 Airborne Receiver:

Has a frequency range of 2.2 - 18.5 mcs. covering 144 crystal controlled frequencies. Weighs 33.2 lbs.

Model AAT, Type 4 Automatic Antenna Tuner:

Operates into all fixed wire antennae. Frequency range 2 - 22 mcs. Average 5 seconds tuning time. Requires no frequency information from transmitter or selector switch. Operates on 27.5 VDC. Weight 16½ lbs.

A-120

3090 S.W. 37th AVENUE MIAMI 33, FLA.

Circle No. 21 on Reader Service Card.

Maintenance Bulletin Board

BRANIFF OMNI-TEST PANEL. Developed and built by instrument shop experts, this all-purpose analyzer tests varied and delicate omnirange instruments. Photo shows William Rutherford with omni-course indicator in his hand, setting dials for calibration test.

Braniff Builds Own Omni-Test Panel

Instrument technicians at the Dallas base of Braniff Airways recently built a set of testing devices and equipment for new omni-navigation instruments at a cost of only $700, and thereby saved their company approximately $18,300.

The new instruments are so complex that the instrument experts at Braniff would have required special training as well as new tools and equipment to check and repair the units. Estimated cost to the company of the new equipment and training: $19,000. Braniff decided to try building its own.

First individual testing units were made—a gadget here, a plug there. Next step was to install them on a single panel. But that really wasn't the answer.

They still needed an all-purpose analyzer to test omnirange instruments. Together they built the "Omni-Test Panel," an analyzer that check the instruments in ten separate testing functions. (There are eight different indicators on the cockpit panel.)

Braniff's omni-test panel has one unique feature. Bill Rutherford, one of the men who helped design it, took an old directional gyro and built into it a precision autosyn unit. That's the key to all the reference readings.

PAA Uses Heavy-Duty Steam Cleaners

Pan American World Airways is making good use of Malsbary heavy-duty steam cleaners at its Miami overhaul shops at three different locations, a mile or more apart from each other.

At the main washrack, a Malsbary 500 cleans aircraft exteriors, wing flap wheels, landing gear, landing gear walls, engine nacelles and engine cowling. These are areas in which insects, dirt and other debris collects in flight.

At the metal shop washrack, another Malsbary 500 cleaner washes away grease, dirt, bugs, oil and soil of atmosphere, engine exhausts from aircraft wheels and engine cowlings, and cleans all carts, wagons, tractors and other materials handling units. It also steam cleans dismounted wings (fuel and oil tanks) inside and out at overhaul time.

At the component overhaul shop, a Malsbary 220 is used for cleaning grease, dirt and gum from sub-assemblies.

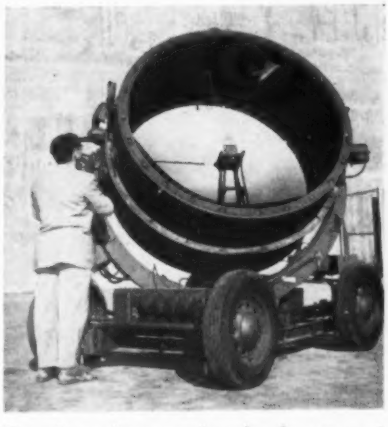
The Malsbary 500s replaced hand methods and small steam vapor cleaners, which were too slow and ineffective. All three cleaners operate steadily eight hours daily.

Searchlights Converted Into Solar Furnaces By GD Engineers

Surprisingly efficient solar furnaces have been constructed from war-surplus anti-aircraft searchlights by thermodynamic engineers of the Convair Division of General Dynamics Corp.

Three 60-in. searchlights, costing $400 apiece, were acquired to augment Convair's 120-in. solar furnace, which had been in operation for a year in the high-temperature testing of metals, plastics, ceramics and other materials used in aircraft and missiles.

Two of the searchlights were converted into solar furnaces producing temperatures of more than 7,000 F. A third, however, is being kept intact to provide a source of heat energy about 60 percent as great as the sun radiates. According to W. F. Radcliffe, engineer in charge of Conviar's thermodynamic group, this could be used when weather conditions blot out maximum sunlight.



Convair engineers made solar furnaces out of surplus anti-aircraft searchlights by stripping them of arc-lighting mechanisms, glass covers.

Polished metal surfaces of the searchlight mirrors concentrate sun rays into a spot smaller than a dime. At this point temperatures greater than 7,000 F. easily can be produced. (An oxyacetylene torch develops a temperature of about 5,800 F.) A special drill chuck holds specimens about the size and shape of a cigarette at the focal point, which is three-tenths of an inch in diameter. The intense heat melts most materials in seconds.

PAA
50,000 TRANS-ATLANTIC CROSSINGS
. . . a record made only by Pan American World Airways
World's Most Experienced Airline

Technical Literature

SPRAYED METAL TOOLING. Uses of sprayed metal tooling and vacuum formed plastics are covered in this four-page brochure issued by Glidden Coating Co.

Circle No. 100 on Reader Service Card.

SINTERED BRONZE FILTERS. Basic information on advantages of porous bronze as a filtering medium and engineering data on filters for fuels, oil and hydraulic fluids used in aircraft and other industries is included in 16-page brochure published by Permanent Filter Corp., titled "Modern Filtration."

Circle No. 101 on Reader Service Card.

OVERHEAD HANDLING. Flexible overhead handling installation in Westinghouse jet engine plant is described and illustrated in six-page folder issued by Whiting Corp. Ten photos show Whiting Trambeam crane and monorail equipment in use.

Circle No. 102 on Reader Service Card.

LAMINATE PLASTIC TOOLING. Fifth edition of Anchor Bushing Catalog, revised to include latest epoxy resin techniques, issued by Rivet Tool Co.

Circle No. 103 on Reader Service Card.

ASBESTOS TEXTILES. An illustrated 16-page manual published by Johns Manville covers asbestos lap, roving, yarn, cloth, tubing, cord, wick, rope and tape. Manual, intended primarily for designers and purchasing agents, includes page or more on each type of asbestos textile.

Circle No. 104 on Reader Service Card.

PRODUCTION FACILITIES. A 24-page booklet that catalogs production facilities of Foote Bros. Gear and Machine Corp., listing machines used in gear cutting, shaping, hobbing, generating and finishing.

Circle No. 109 on Reader Service Card.

BOEING TURBOPROP YC-97J. One of two Stratofreighters modified for USAF as test bed for Pratt & Whitney T34 engine. Second YC-97J was flown recently on a 90-minute maiden flight and both aircraft are slated for Military Air Transport Service duty. T34s rated at 5,700 eshp provide nearly 63% more power and cut empty weight almost 5,000 lbs. Three-bladed props replace 4-bladers on standard C-97.

SPHERICAL BEARINGS AND ROD ENDS. Descriptions and illustrations of a wide variety of spherical bearings and rod ends for aircraft and industry are contained in a 16-page catalog, No. 455, issued by Spherical Bearing Corp.

Circle No. 111 on Reader Service Card.

PHOSPHATING COMPOUNDS. "A Better Bond For Organic Finishes" is the title of a four-page pamphlet issued by Turco Products Inc. which describes the purposes of the company's line of phosphating compounds.

Circle No. 112 on Reader Service Card.

PRODUCTION FACILITIES. A handsome 38-page brochure describing the production facilities, operations and products of Giddings & Lewis Machine Tool Co. Profusely illustrated with excellent photos and drawings, including four color photos.

Circle No. 113 on Reader Service Card.

NUCLEAR RADIATION. A bulletin entitled "Improved Manufacturing and Processing Through Nuclear Radiation" containing case history information on use of radioisotope thickness gauges. Published by Radioactive Products, Inc.

Circle No. 114 on Reader Service Card.

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Home of the "Q.B's"
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Cinegrill ★ Garden Grill
Heated Swimming Pool
under management
Hull Hotels

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ROOSEVELT
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THERE IS A REASON WHY!

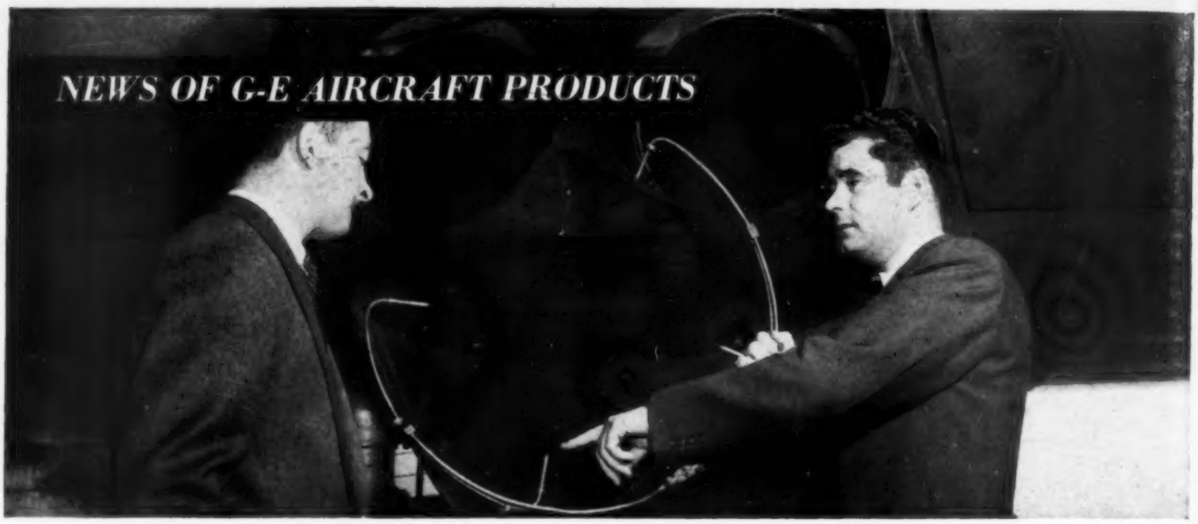
DALLAS AIRMOTIVE OVERHAULS MORE AIRCRAFT ENGINES THAN ANY OTHER COMPANY IN THE WORLD

DALLAS AIRMOTIVE INC.

6114 Forest Park Road, Dallas, Texas ELmhurst 3771

Circle No. 22 on Reader Service Card.

NEWS OF G-E AIRCRAFT PRODUCTS



G-E exhaust gas thermocouples are easy to install and service. Have been proven in 6,000,000 hours of operation.

G.E. offers prototype thermocouple systems for new jet engines in record time . . . without charge

General Electric is now ready to provide a prototype gas thermocouple system for your aircraft gas turbine without charge. Whether rigid or flexible type, these systems can be designed to meet almost any requirement. Past prototype systems have been delivered for installation within 24 hours after date of original request.

Advantages of G-E thermocouples

Manufactured by the G-E Instrument Department in West Lynn, Massachusetts, your General Electric prototype thermocouple will have these advantages:

1. Lighter weight, because of self-supporting harness—there is no need to install extra mounting brackets on the tail pipe. This reduces installation cost and weight.
2. Greater reliability—because of fewer connections, G-E exhaust gas thermocouples are less apt to develop connector failures.
3. Fewer service problems—the thermocouple harness assembly and leads consist of only 3 pieces which makes for easier installation and reduces chance of lost parts.

Better construction

Every G-E thermocouple system is insulated with compacted magnesium oxide powder enclosed in a stainless steel tubing. This construction withstands ambient temperatures of at least 1000 F.

Proven In Service

More than 6 million flying hours have already been logged with jet engines using G-E exhaust gas thermocouples. They are used both in systems that indicate and in those that automatically control the temperature. The temperatures are normally in the 1200 F range with transients up to and above 1600 F.

For further information on ordering a prototype gas thermocouple system to fit your requirements, see your nearest G-E Apparatus Sales representative. Send in coupon below and check off "A" to get bulletin GEC-1297, for a rundown on the complete line of systems offered.

400-cycle alternator meets tough guided missile demands

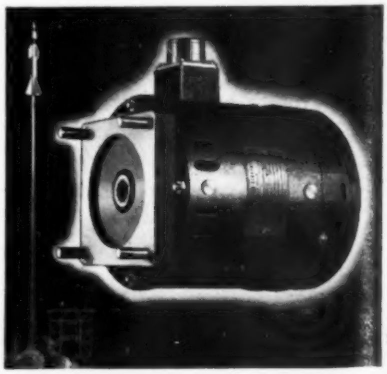
Developed to withstand the tremendous range of shock, temperature and atmospheric conditions encountered in guided missile applications, the G-E explosion-resistant 400-cycle alternator meets rigid environmental and military specifications (MIL-E-5272A). Rated up to 1500 volt-amperes, 12,000 rpm, for output of 115 or 208 volts, the unit is designed to be driven by a wide variety of motor, turbine, and ram-air drives.

The alternator can be readily coupled to a drive unit with an AND 10261 or AND 20001 mounting pad. Modifications of these mounting pads can be made to meet specific application requirements. The unit is very versatile in both construction and application, and can be manufactured to produce more output when required.

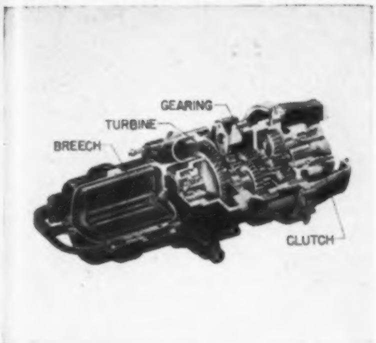
Weighing only fourteen pounds when equipped with the AND 20001 mounting pad, the new alternator is a lightweight unit having an unusually high power.

To meet requirements of MIL-E-5272A regarding altitude, shock, temperature, vibration, humidity, foreign elements, and centrifugal force, the alternator underwent exhaustive testing—a standard procedure for all G-E aircraft and armament motors.

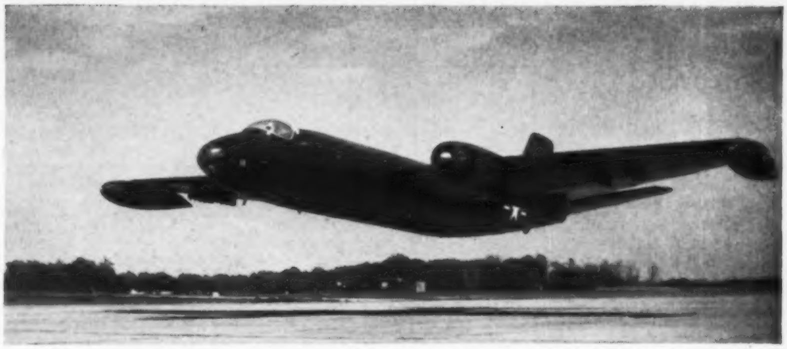
For more information on how this motor can satisfy your aircraft and armament problem, check "C" in coupon for GEA-6269B, and return to address indicated. Remember—your specifications are all that G-E engineers need to handle your toughest requirements.



New 400-cycle alternator passed rigid testing to meet specs regarding altitude, shock, temperature, vibration, humidity, sand and dust, and centrifugal force. General Electric offers hundreds of other type motors to meet any aircraft requirement.



Cutaway view of cartridge starter for jet engines shows main operating parts.



B-57 takes off after fast start with General Electric cartridge turbo starter. Pilot is able to get immediate highly dependable starts at the push of a button. Starter torque output is relatively constant providing rapid start without damage to jet engine gear train.

Cartridge starter turns over Martin B-57 jets fast for quick takeoff

A small General Electric cartridge starter that will kick off the Air Force's Martin B-57 for a quick takeoff is now in operation.

The new starter, known as Model S-12, uses a solid propellant charge which is ignited electrically at the push of a button. The rapid burning of this charge provides hot gases which turn a small turbine wheel. This wheel is engaged through a reduction gear system and clutch to start the pump's jet engine power plants.

Allows Take Off From Any Airfield

Importance of the cartridge turbo starter is that it permits fast starts on planes scattered over any part of any airfield, without ground power, since no ground power units are needed for starting. Every B-57 carries it own engine starting power. Further information on this starter can be obtained from your nearest G-E Apparatus Sales representative, or by checking "B" on coupon below and mailing in for bulletin GEA-5872A.

G-E transformer rectifier designed for reduced weight

Aft compartment of B-36 shows G-E transformer rectifier mounted for easy inspection.

Converting a-c power to d-c on the Convair built Air Force B-36 are General Electric airborne transformer rectifiers. The units are designed to offer a lightweight means for obtaining on-the-spot direct current required for the d-c equipment, and eliminate the long, heavy d-c bus runs and d-c generating equipment which would otherwise be required.

Transformer rectifiers to your applications

These transformer rectifiers, as well as the other models now being currently produced by G.E., offer a lightweight, highly dependable, flexible source of direct current, and require a minimum of maintenance. G.E. now covers a range of applications for 208 volt a-c aircraft power supplies ranging from 1 amp to 200 amps, both regulated and unregulated. Regulation is accomplished by means of magnetic amplifiers. D-c output can be filtered to meet almost any ripple specification. Efficiency varies between 72½% and 85% depending on conditions of operation and the type of unit.

Designed for your requirement

Regulated units can be paralleled with each other or with a d-c generator. Cooling is done by convection, or fan. Protective features such as undervoltage relays and overvoltage relays can be provided.

For further information on these new lines of transformer rectifiers, see your nearest G-E Apparatus Sales representative. General Electric Company, Schenectady 5, New York.

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☐ "B" Aircraft Gas Turbine Starters, GEA-5872A
☐ "C" New 400-Cycle Alternator, GEA-6269B

Name.. Position....................................
Company.. ☐ For immediate project
Street.. ☐ For reference
City.. Zone........ State....................................

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PROFIT AND LOSS

Firm	Period Ended	Current Net	Previous Net	Earnings Per Common Share Current	 Previous
Lockheed Aircraft	Q 3/31	$4,596,058	$4,807,505	$1.63	$1.70
Northrop Aircraft	Q 4/30	$2,397,770	$734,416	$1.61	$0.52*
Northrop Aircraft	9 mos., ending 4/30	$8,999,382	$1,854,856	$6.05	$1.31*
Ryan Aeronautical	6 mos., ending 4/30	$ 796,596	$1,054,088	$2.09	$2.76
Northrop Aircraft	9 mos., ending 4/30	$8,999,382	$1,854,856	$6.05	$1.31
Solar Aircraft	year ending 4/30	$2,073,126	$2,048,108	$3.03	$3.05

*Adjusted for 2 for 1 stock split in Nov., 1954

Subsidy Charges False, Says Boeing's Allen

Recent Capitol Hill charges that the aircraft industry is non-competitive and that profits are too high (AMERICAN AVIATION, June 20) have not gone unanswered.

Taking issue with both charges during a West Coast speech late last month was William M. Allen, president of Boeing Airplane Co. "I make the unqualified statement that the aircraft manufacturing industry is highly competitive," Allen told a Washington State Bankers Association convention.

Industry may not compete in the same fashion as two flour millers trying to sell to the government, he admitted, but each new plane contract is awarded because of a superior design, lower price, ability to produce, or a combination of these factors.

• **As for subsidy,** the Boeing head commented that "an industry is not subsidized because it does business with the government. If the term is applied because the government has made available to industry certain plants and machinery with which to build aircraft, then I submit that the term is again being misused.

"The plants and equipment are not given to the manufacturers. They are made available . . . for use because private industry is not in a financial position to provide itself with all necessary facilities."

Allen's explanation for this was two-fold:

• **Very large fluctuations** in demand, brought on by wars or international tensions, at times require production far beyond ordinary peacetime needs.

• **Industry has not earned enough** over the years to enable it to provide itself with the plant and equipment needed.

Answering high-profit charges, the Boeing official pointed out that his firm realized a 3.5% return on sales in 1954 and 2% in prior years. This, he said, is typical of the entire industry.

In contrast, he noted, average return for all manufacturers in the U. S. is 6 to 7% on sales, and leading companies do even better.

• **Allen labeled** the other yardstick—return on net worth—as "unfair" for a number of reasons. For one, it gives no recognition to a return on production resulting from opertion of government-owned facilities. Neither does it consider the amount of borrowed capital.

Instead of recognizing true net worth, he pointed out, it is computed on book net worth. At Boeing, Allen said, the $22-million depreciated book value of assets at the end of 1954 would require at least $100 million if replaced.

If return on net worth were a fair criterion, he concluded, it should certainly be considered over a period of years rather than on two or three peak years. In only three out of nine post-war years has the aircraft industry had a greater return on net worth than all manufacturing, and the average for aircraft producers in this period is below that of all U. S. manufacturing.

• • •

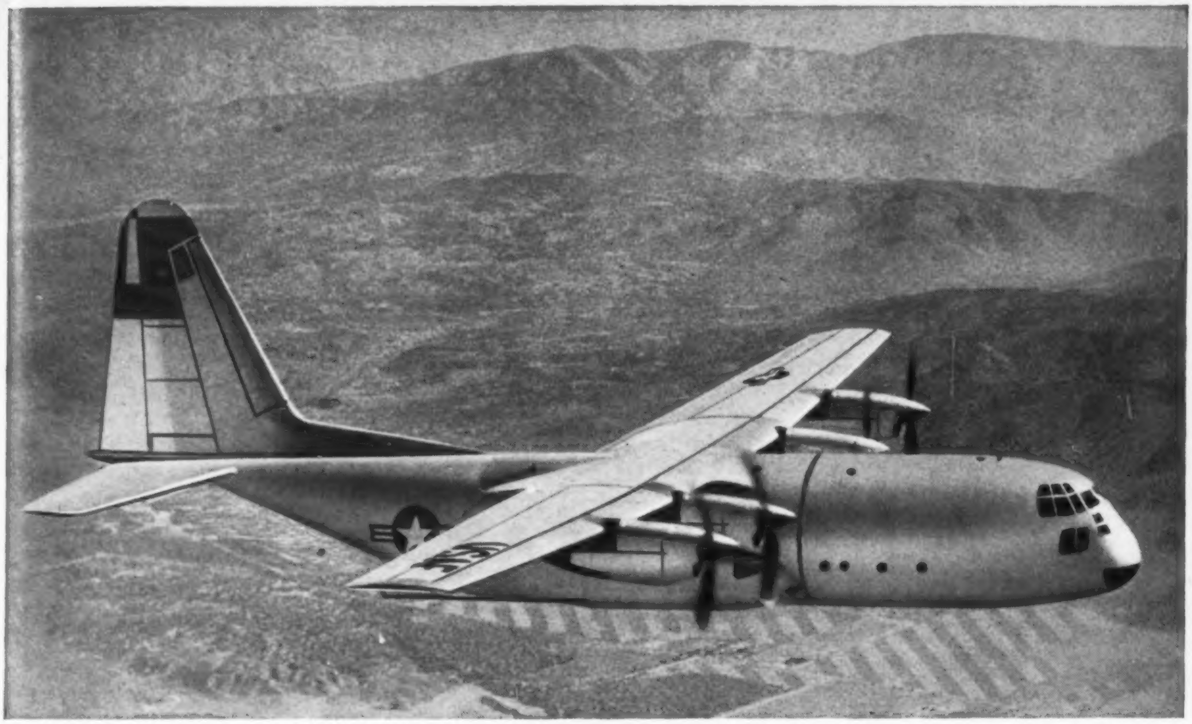
FACILITIES

• **Braniff International Airways** has signed a 30-year agreement with the City of Dallas for the lease and construction of a new 36-acre base at Love Field. The agreement, signed by Braniff's President Charles E. Beard at a special session of the City Council, specified that the cost must not exceed $4,000,000.

• **Hycon Manufacturing Co.** has leased an additional 17,000 sq. ft. of office and engineering space in Pasadena, Calif., for camera design and manufacturing purposes.

• **Douglas Aircraft's** Santa Monica Division plans to build a $500,000 structure to provide office space for some 250 persons, including representatives of airline customers of the company. The new building is scheduled to be ready for occupancy in the spring.

PRICE OF AN AMERICANIZED version of the Morane-Saulnier 760 "Paris" twin-jet executive plane is expected to be in the neighborhood of $300,000. However, Beech Aircraft Corp., which currently is demonstrating the four-place craft to potential military, civil and foreign buyers, probably will not start production without advance orders for at least 50. If the Wichita company decides to build the French plane under license, deliveries of an Americanized version would start 18-24 months after the go-ahead is given. The pressurized plane has a top speed of 410 mph, maximum range of 1,015 miles.



First Flight of the **Hercules**

powered by America's first production Turbo-Prop engines

A NEW era in America's military transport operations was opened when the U.S. Air Force's first production Turbo-Prop cargo transport, the Lockheed C-130A Hercules, took off from Dobbins Air Force Base, Georgia.

Powered by four Allison T56 Turbo-Prop engines, the 54-ton transport was air-borne eight seconds after the brakes were released and climbed to 2,500 feet by the time it passed over the end of the 10,000-ft. runway. Test Pilot B. A. (Bud) Martin said: "It is the finest flying airplane I have ever operated."

Developing more than 2.3 horsepower per pound of engine weight, and with a frontal area approximately half that of present transport piston engines, the 3750-h.p. T56 gives the four-engine Hercules a speed exceeding that of many World War II fighters.

A commercial version of the military engine – the Allison Model 501 – will bring new standards of faster, quieter, more comfortable air travel in airliners that can operate from any airport now served by commercial air carriers. And, with its economical use of lower-cost fuel, this new engine will substantially reduce the operating cost of the all-cargo transport.

These great new Turbo-Props reflect the knowledge Allison has gained in designing and building gas turbine engines which have flown more than six million hours. These engines are daily flying the equivalent of one hundred trips around the world—*experience where it counts most—in the air.*

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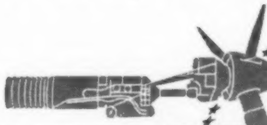

ALLISON
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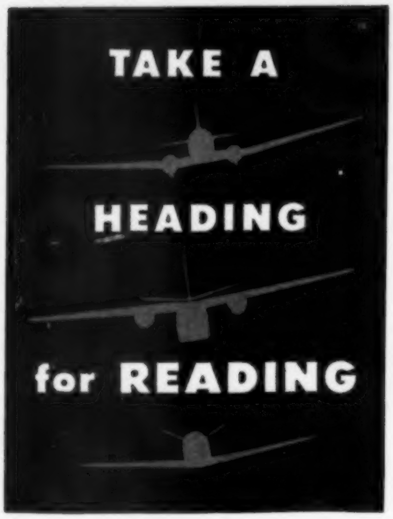
American built for the new era in air travel

Opportunities for engineers in Allison's $75 million expansion of aircraft engine research and development facilities. Write: Technical Employment Section



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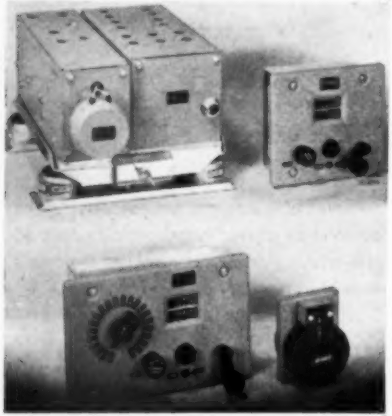

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People

MANUFACTURING

Holloway

Bert W. Holloway has been appointed to the newly created position of corporate director of advertising, publicity and promotion for Lockheed Aircraft Corp. **C. E. W. Stevens** is new corporate advertising manager under Holloway. The publicity and sales promotion staffs of the discontinued sales dept., headed respectively by **Richard L. Bean** and **Richard S. Lochridge,** now report to **William R. Wilson,** manager of the California Div. public relations dept.

Edgar L. Conn appointed manager of manufacturing, South Wind Div., Stewart Warner Corp.

Otis R. Lail, Jr., appointed special representative for airport lighting by Sylvania Electric Products Inc.

R. J. Krause appointed chief administrative engineer at Pacific Div., Bendix Aviation Corp.; **George Wollinger** returned to the division as asst. to gen. mgr.

Airborne Instruments Laboratory announces the promotion of **Arthur J. Hendler** to asst. supervising engineer, applied electronics section, Research and Engineering Div.

Fred Landgraf, helicopter designer and president of the former Landgraf Helicopter Co., named special projects engineer for Ryan Aeronautical Co.

Convair Division of General Dynamics Corp. appointed three new engineers: **Jack L. Bowers, Jack Mason,** and **Dr. Marvin Stern.**

E. C. (Chris) Mireau made vice president-manufacturing, Zenith Aircraft, Div. of Zenith Plastics Co.

Adm. H. B. Sallada (USN ret.), named exec. vice president, Chance Vought Aircraft, Inc. Other new vice presidents are **N. V. Turney,** who is also controller; **R. C. Blaylock,** engineering; **C. E. Burt,** production; and **W. P. Thayer,** sales and service.

Irving H. Taylor joined Aircraft Industries Assn., Inc. as associate director of export service.

Dr. Chauncy Starr elected vp in charge of nuclear engineering and manufacturing, North American Aviation, Inc.; **Gerald B. Brophy** also elected vice president.

Earl R. Uhlig, controller of the Glenn L. Martin Company, also made vice president-finance.

Alexander H. Flax appointed asst. director of the Cornell Aeronautical Laboratory.

W. T. (Ted) Noll appointed director of manufacturing for aeronautical div., Minneapolis-Honeywell Regulator Co.

August Bringewald promoted to manufacturing engineer and **Richard E. Stegler** to succeed him as chief of manufacturing research and development, Republic Aviation Corp.

Edward J. Odlum named asst. gen. mgr. of Kaman Aircraft Corp.

E. Vernon Jaramillo appointed project engineer of Delavan Manufacturing Co.

Cecil Day succeeds **Chester M. Weaver** as mgr. of Boeing Flight Center, Boeing Airplane Co.; Weaver named special asst. to director of pilotless aircraft.

AIRLINES

E. Harold Kiltie appointed chief pilot of Riddle Airlines.

Robert W. Newhouse made district manager for Air France in Cleveland.

Raymond E. Smith appointed director of public relations for National Airlines.

Charles R. Dworshak named director of sales and traffic for Slick Airways, Inc.; **A. C. Hunt,** asst. director of sales, administrative; **T. W. Holmgren,** asst. director of sales, special projects.

Darryl G. Weishaar appointed asst. traffic mgr. for Ozark Air Lines.

MILITARY

Brig. Gen. Frederic H. Miller, Jr., asst. for programming at AMC headquarters in Dayton, designated AMC's deputy vice commander. He will be replaced as asst. for programming by **Brig. Gen. Ben I. Funk,** a former AMC inspector general.

Col. Franklin K. Fagan, former inspector general of ARDC, assigned acting director of Armed Services Technical Information Agency in Dayton, Ohio.

Frank M. Ewing named Deputy Asst. Secy. of Defense to succeed **Rudolph W. Weitz,** resigned.

Dr. Thomas J. Killian named deputy chief and chief scientist of the Office of Naval Research.

HONORED

Belinn

Clarence M. Belinn, president of Los Angeles Airways, named "Aviation Man of the Year," the second man to be so honored, by employes of airlines serving Los Angeles International Airport.

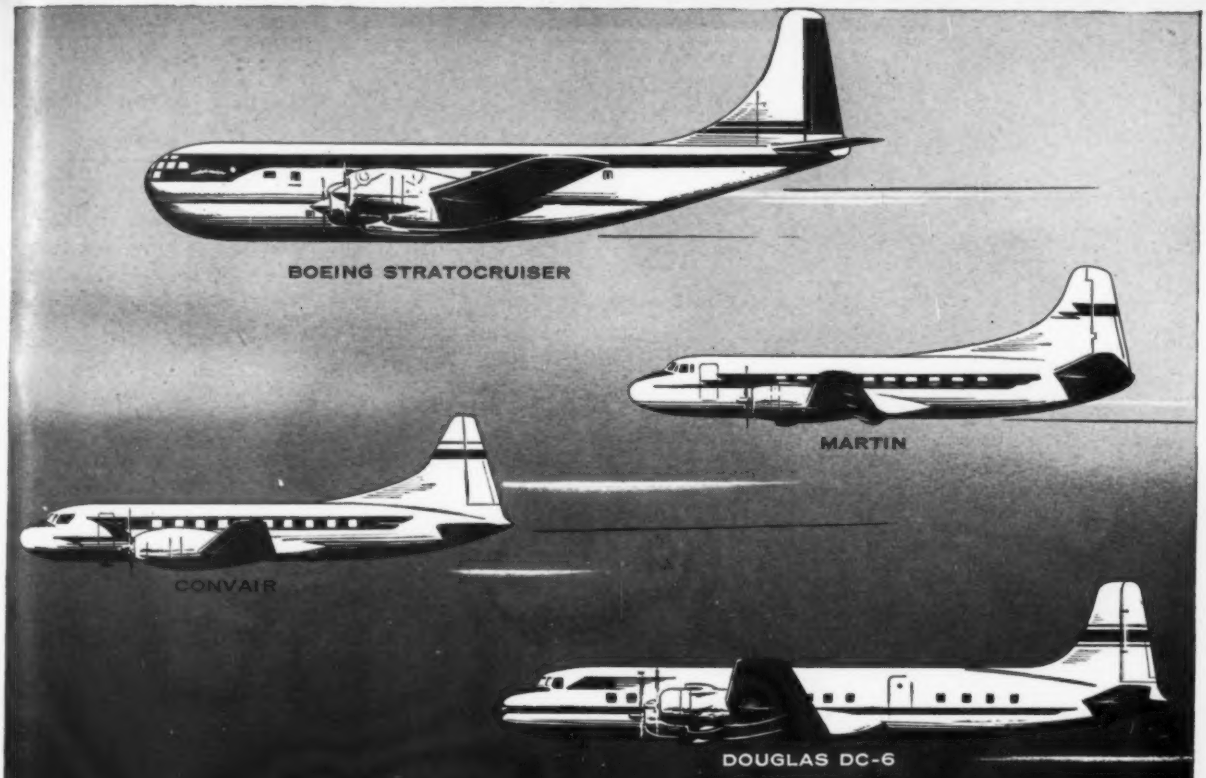
James H. Doolittle elected president of Wings Club in New York.

Leonard Sinclair Hobbs, aviation engineer, received honorary degree of Doctor of Laws from Texas A. and M. College.

HONOR ROLL

A Quarter Century in Aviation

- **Leroy R. Grumman,** Grumman Aircraft Engineering Corp. Chairman of the board, Bethpage, N. Y.
- **L. A. (Jake) Swirbul,** Grumman Aircraft Engineering Corp. President, Bethpage, N. Y.
- **William T. Schwendler,** Grumman Aircraft Engineering Corp. Exec. vp, Bethpage, N. Y.
- **E. Clinton Towl,** Grumman Aircraft Engineering Corp. Administrative vp, Bethpage, N. Y.



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West Coast Talk... By Fred S. Hunter

- Airport control job no soft touch
- DC-8 operating costs beat DC-6B

NOW here's a startling bit of intelligence. During 1954, tower controllers at the Los Angeles International Airport handled 18,909 instrument approaches. That's 5,138 more than the nation's busiest airport, Chicago. Who said "sunny" California?

Hunter

On the payroll, the CAA chooses to call a tower controller an Airways Operations Specialist (Airports). But whatever the boys in the tower cabs are called, we'd say they earn their money.

There are seven positions of operation at a big airport — inbound flight data, outbound flight data, local control, ground control, approach control (radar), departure control (radar) and precision radar. Tower controllers have to be able to do them all with equal facility.

Local control is the "toughie" at Los Angeles. With Douglas and North American factories located at the airport, local control involves interspersing the various types of airlines with high-speed jets, like the F-100 and the F4D, along with slow light aircraft types (coming in for a little attention from Jack O'Brien's AiResearch service shop) and Clarence Belinn's busily fluttering helicopters, and there are practically no idle moments.

If you want a job that will keep you on your toes, an airport control tower is the place.

• •

Re the DC-8—Douglas estimates operating costs at 1.2¢ per equivalent passenger mile, which beats even the DC-6B, currently its record-holder in this department . . . Ratings on the advanced version of the P&W J57, which Douglas plans to use, are still classified, but the engine likely falls in the 10,500/11,500-pound thrust bracket . . . All wind tunnel work had been completed when the Douglas directors made their decision to proceed with the turbojet, which is one reason why they came to the decision they did . . . Final assembly on the DC-8 probably will take place at Douglas's Long Beach plant.

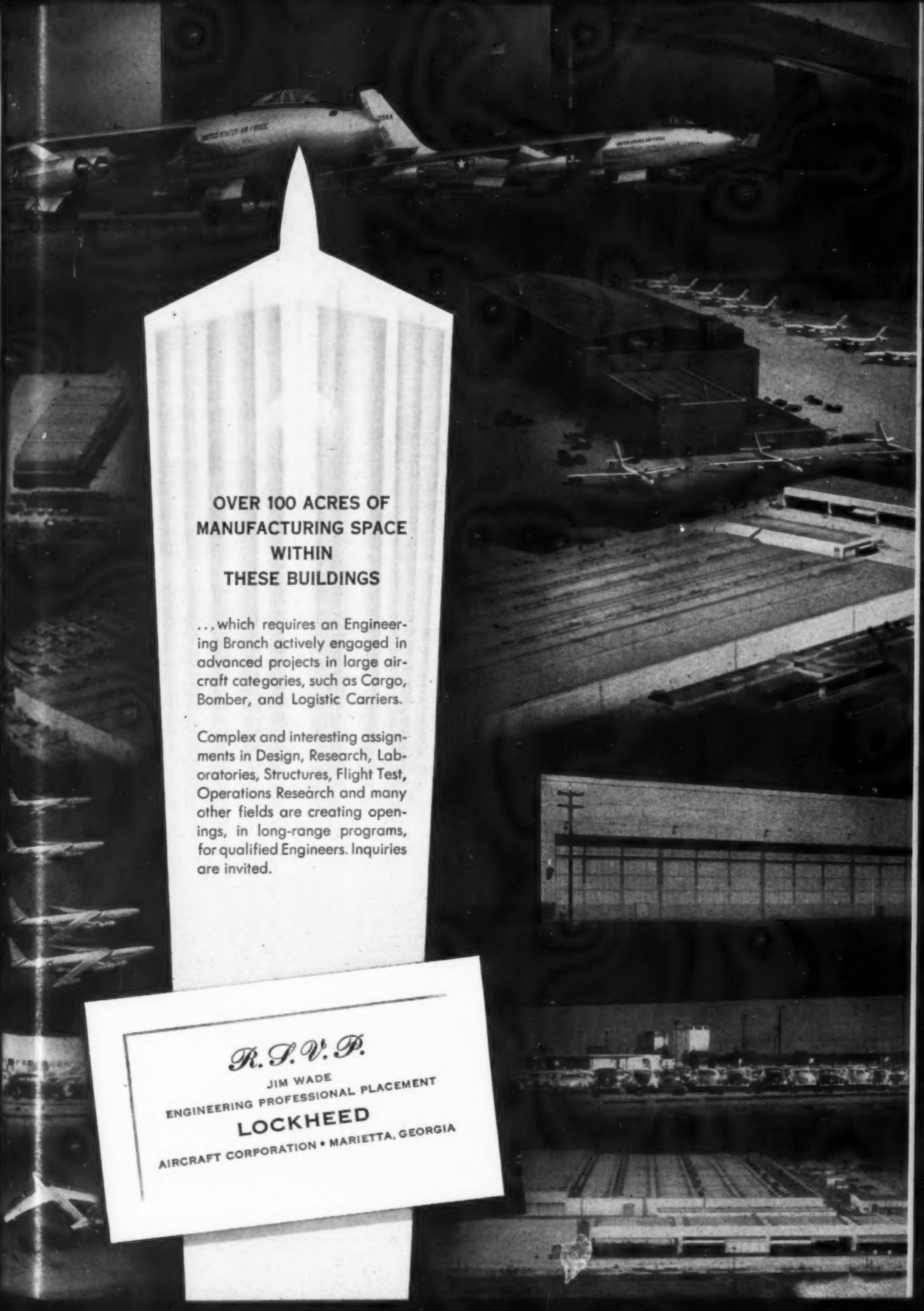
Re the Electra—American Airlines engineers will sit in with Lockheed engineers in applying the finishing touches to the design of the turboprop, a new twist . . . Lockheed's change-over from its preference for power controls to the aerodynamically boosted mechanical type for the Model 188 caused some industry eyebrows to lift . . . Carriers, considered prospects for turboprop Electras, that operated Lockheed's first Electras include Braniff, Delta-C&S, Eastern, Northwest and Pan American. Lockheed built 148 of the twin-engine, 10-passenger Model 10 Electras in the 30's and about 75 are still flying.

• •

Re the T56—The 3750 hp 501-D10 is the commercial counterpart of the T56A1-3, currently going into Lockheed's C-130's . . . Time between overhauls starts out at 400 hours, regarded by airlines as low, but Allison anticipates the time will be extended to 1000 hours in three years . . . Fact the T56 has been checking right on the button on specifications at altitude adds to Allison's confidence it has a good commercial engine . . . General Motors hopes to sell a power package which includes its own Aeroproducts propeller, but it is up against competition from Curtiss and Hamilton Standard.

• •

Homer Rhoads, Hydro-Aire president, feels sure the new military acceptance of the Hytrol anti-skid system will lead to its eventual adoption for practically every airplane in production . . . Jack Jerman, vp of facilities and construction, recently became the first 20-year employe of the Hughes Tool Co.'s aircraft division . . . Both the F-100C and the F-100D coming up at North American are fighter-bomber versions of the supersonic aircraft . . . Los Angeles Airways crews are calling the early morning passenger flight from Santa Ana the "hair-curler" special because housewives don't bother to doll up to drive their husbands to a heliport as they would an airport and invariably have their hair in curlers.



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International Aviation

By Anthony Vandyk

LONDON—This reporter has just had the privilege of being the only press representative on the initial leg of Capital Airlines' First Viscount delivery flight. The experience confirmed that Capital undoubtedly has the finest of all Viscounts built to date and that the Capital version is quieter (in the rear part of the cabin at any rate) than any other Viscount.

The interior, with its very smart decor and individual loudspeaker, hidden behind the curtains between the windows, makes a tremendously favorable impression

The Capital delivery flight started on the same day that KLM's order for the Viscount was announced. The importance of securing the Dutch company's business is realized by all connected with the sale and purchase of commercial transports, for KLM has been a consistent buyer of American equipment.

Many European observers consider that the KLM order is in a sense more important than Capital's since it may well open the door to the pro-American "neutrals" such as the "Three S's"—Sabena, SAS and Swissair.

Although Vickers has never underestimated the sales potential of the Viscount, it did underestimate the ingenuity of its customers to think up changes that could be made on the standard aircraft and the impact of these changes on its production organization. During the last four years the company has spent six times the design effort that it took completely to design the whole of the original Viscount.

At present Vickers has some 25 different customers for the Viscount and almost exactly that number of configurations of galleys and toilets. The net result of this impact on the production line has been delays in deliveries. Nevertheless by the end of 1955 the company's production should be back on schedule.

The production lines looked very healthy to this observer, who noted (during his visit in mid-June) that the eleventh TCA Viscount was about to fly, as was the first for British West Indian Airways. The second for Hunting-Clan left during his visit. The 25th and 26th Viscounts for BEA were almost ready, as were Capital's second and third aircraft.

Visible on the line, in various stages of completion, were Viscounts for Iraqui, LAV, Misrair, Fred Olsen and the Indian Air Force. The scoreboard read: 226 ordered—58 delivered.

BOAC Plans to Extend London—N. Y. Route

British Overseas Airways Corporation plans to extend its London-New York route to Chicago and San Francisco prior to inaugurating its "polar" route from London to San Francisco via Edmonton, chairman Sir Miles Thomas told AMERICAN AVIATION in an exclusive interview in London. He said that while inauguration of the "polar" route will have to wait until DC-7Cs or Britannias are available, the westward extension from New York will probably take place earlier with Stratocruiser equipment.

Sir Miles said that BOAC expects to have four Britannia 100s by the end of the year and to start passenger-carrying service with these aircraft to South Africa in April 1956. He hoped that the certification of the Britannia would be completed toward the end of the year. The second Britannia route will be London-West Africa. The turboprop transport will next be introduced on services to the Far East and then on the Australia run.

The 10 DC-7Cs which BOAC has ordered will be used exclusively on the North Atlantic, Sir Miles indicated. He said he is a great believer in Douglas Aircraft Co.'s engineering and in aircraft which result from "evolution not revolution"—hence his admiration of the DC-7C design. He also alluded to the Rolls-Royce Merlin-powered Canadair Argonaut, a Douglas design "which made a bigger contribution than anything else to getting BOAC out of the red."

The Argonauts will be the first of BOAC's present passenger aircraft fleet to be sold when new equipment is available. Asked about the Rolls-Royce RB 109-powered DC-7D project, Sir Miles declared that "the idea was good but the delivery dates were wrong."

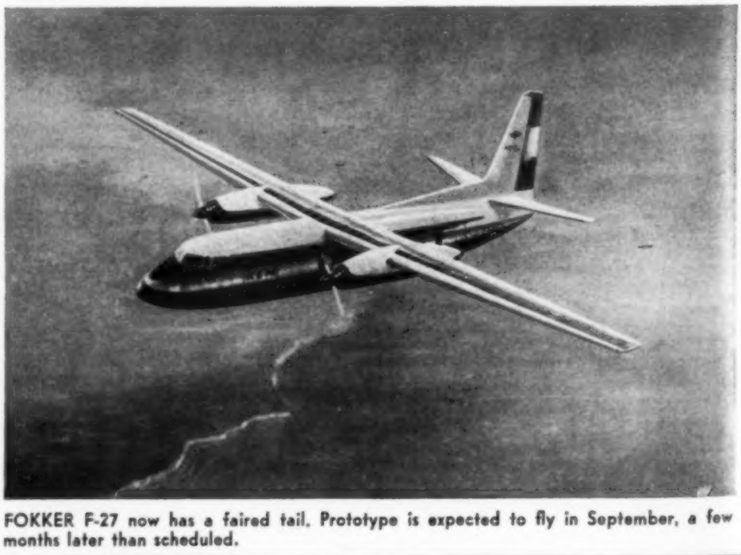
The BOAC chairman said that the corporation has ordered 12 Viscount 700Ds, six for its Middle East subsidiaries and six for "other projects now under study."

Asked about the Comet 4, Sir Miles said the structure must be absolutely beyond suspicion. Low-altitude tests of the aircraft's Rolls-Royce Avon 29 engines will be made with the Comet 3 while high altitude "flogging" of the engine will be carried out in Comet 2s. Sir Miles hoped that a full fleet of Comet 4s would be available in 1958. He said that on a recent trip to Africa he was repeatedly told how enthusiastically the return of the Comet is awaited.

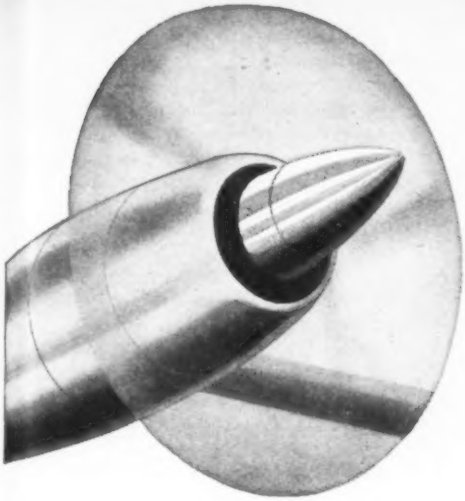
Transport Briefs

Japan Air Lines is to order four Douglas DC-7Cs instead of Comet 2's... Delivery of the 20 Comet 4s (strengthened version of the Comet 3) ordered by **BOAC** will start in 1958 . . . **Airwork Ltd.** is now having crews trained by Douglas Aircraft Co. at Santa Monica; it gets its first two DC-6As early in 1956 and the third a year later.

SABENA Belgian World Airlines carried 18,388 helicopter passengers in 1954, including 12,656 on scheduled flights; total number of flights was 3,765 and the S-55 fleet logged 6,991 flying hours during the year . . .



FOKKER F-27 now has a faired tail. Prototype is expected to fly in September, a few months later than scheduled.



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Survey Shows 66.8% of Terminal Airports in U.S. Levy Landing Fee

By LOIS C. PHILMUS

An American Aviation survey has found that 66.8% of the terminal airports in the U.S. levy a landing fee, with 33.9% charging for all types of aircraft, 39.8% for airlines only, 19.3% for all commercial planes including business aircraft and 7% charging on size rather than use of equipment.

The survey results are based on receipt of 256 questionnaires completed out of a total of 543 airports contacted for a precedent-setting 47.1% return. Responses were received from all 48 states and the District of Columbia.

The most used yardstick for computing landing charges was the number of landings or frequency, reported by 48 out of 171 of the airports reporting charges usually effecting airlines. Weight of aircraft as a means for determining rate of landing fees was second, used by 39 airports, and the combined weight/frequency measurement, reported by 31 airports, third.

• **Forty-four airports** specifically stated how charges were computed for business and private aircraft. Weight of plane is used by 18 terminal fields with 17 levying a minimum fuel and oil purchase charge, six computing charge by aircraft type and three using flat rates.

Civil transients staying overnight at 45 of the responding airports are charged a landing fee while 208 make no charge. Thirty-eight out of 253 terminals collect a landing fee for brief stops to pickup or discharge passengers and 18 collect a fee for refueling stops.

• **Tie-down fees** ranging from 50¢ to over $1.00 were reported by 99 out of 247 airports. Fourteen based tie-down on aircraft weight. One dollar was the standard fee for those employing a flat rate with 38 collecting that sum. Nineteen charge 50¢; five, 75¢, and 23 airports more than $1.00.

Sixteen out of 227 airports reported no hangar space for single-engine equipment staying overnight with 31 having no facilities for multi-engine transients. Flat rates for single-engine overnight hangaring for those having space ranged from as low as $1.00 to up to $3.00. Forty-three airports charge $1.00; 62, $1.50; 56, $2.00; 21, $2.50 and 17, $3.00.

• **Multi-engine overnight** hangar rates ranged from $1.00 up to $8.00 where a flat charge is in effect. Several reported basing rentals on size or weight of aircraft in preference to the flat rate. Flat rates by number of airports are as follows: $1.00, 4; $1.50, 5; $2.00, 30; $3.00, 19; $4.00, 14; $5.00, 70; $6.00, 4; $7.00, 2, and $8.00, 18. The $5.00 hangar charge came closest to being standard.

Prevalent throughout the survey was the fact that region had no effect on amount of charges. Two airports in the same area could have widely differing methods of charging, in some cases one airport would levy fairly high fees with the second making no charge at all.

Airport activity seemed to have the widest effect. High airline traffic terminals tend to charge non-carrier aircraft on a higher, though more consistent level, than low-traffic points.

BELL AIRCRAFT COR

EXECUTIVE HELICOPTER. Bell Aircraft Company recently delivered the first of its new business helicopters. Purchaser is Gen. Gustavo Rojas Pinilla, president of Colombia, himself a helicopter pilot. Designated the Model 47H-1, the new helicopter has a speed of 100 mph, a range of over 200 miles and absolute ceiling of 14,800 feet, adequate to lift it over the Andes Mountains. Exterior is painted in the national colors of the South American republic, with the crest on the door. Interior was upholstered in color-matching leather and fabric.

Speed Control System Approved by Cessna

Speed control system, manufactured by Safe Flight Instrument Corporation of White Plains, N. Y., has been approved by Cessna Aircraft Company as optional factory equipment on its Models 170, 180, and twin-engine 310.

Designed to compute low-speed operations, take-off and landing speeds, the instrument's basic principle involves wing lift measurement. It is a computer compensating for flight variables of power, gross weight, flap and gear position, turning and longitudinal accelerations, ground effects, and density altitude.

Kansas Women Create Flight Safety Award

The Kansas Women's Aeronautical Association has established an annual business flight safety award, Ruth Elliott, association president, has announced. The award will be administered by the National Business Aircraft Association. It will be presented to the person in industry "who has most effectively carried out and promoted business flight safety."

Walter C. Pague, NBAA chairman of the awards committee, has been appointed chairman of the KWAA award group, with Adella Allen of Wichita as vice chairman. The new committee meets in Washington this month to consider nominations for the award, which will be presented at the eighth annual meeting and forum of NBAA in Detroit, October 5-7.

Franchises Awarded

Aero Design and Engineering Company of Oklahoma City has been awarded three new Aero Commander franchises. Largest territory has gone to L. B. Smith Aircraft Corporation of Miami for Florida, Alabama, Georgia, Cuba and the Bahamas.

Other franchises have been granted

to Aero-Tex Corporation of Dallas for Northeastern Texas and to Johnson Air Interests, Inc. of Racine, Wisc. for the state of Wisconsin. The latter firm provides executive air transportation for the Johnson Wax Company and is now expanding into aviation sales.

Transoceanic Learstars Specially Equipped

Two Learstars specially equipped for transoceanic flying were delivered last month by Lear Aircraft Engineering Division, Santa Monica, Calif., to Charles B. Wrightsman of Palm Beach, Fla., and Johnson & Johnson, New Brunswick, N. J., surgical supplies manufacturer.

Engine accessories were selected by make and model so that they could easily be interchanged with equipment used by international and foreign airlines. Provision was made for radio equipment to operate on frequencies compatible with both U.S. and foreign ground stations. Automatic pilots were coupled with radio navigational computers, making possible "push-button" flights.

Learstars have been certificated by the Civil Aeronautics Administration as airline transports. According to J. Nelson Kelly, general manager of the company's egineering division, orders on hand cover production well into 1956.

New Heater Cycling Control Unit

Barber-Colman Company of Rockford, Ill., has announced the development of an Aero Commander automatic heater cycling control. The system, which maintains selected cabin temperature within ±2F, is similar to one installed on larger multi-engine aircraft in the DC-3 and Lodestar class.

The company states that the control is based on a temperature sensitive resistance bridge circuit using a Micropositioner, an ultra-sensitive polarized relay, as the bridge unbalance detector. The relative resistance of the temperature sensing elements located in the cabin exhaust air, heater discharge air and outside air automatically cycles the heater ignition and the fuel solenoid.

Cabin temperature is selected on a rheostat located on a control panel above the co-pilot seat. A switch on the panel selects automatic or manual operation. Indicator lights show when the heater is cycling and warn the pilot of overheating.

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The 1955 National Aircraft Show is approaching its opening with the distinction of being larger and even more outstanding than any of its predecessors.

Already 90% of the airframe manufacturers and all of the engine companies have acquired 72% of the total exhibit space. To date, space reservations for exhibits already exceed those of previous years.

This Show not only has been accorded nationwide acceptance by all divisions of the aviation industry—but is the only major aviation show for 1955 designated by the U. S. Department of Defense for full participation of the Armed Services both "on the ground" and "in the air."

To exhibit is to share the good will and benefits that will accrue from such participation.

If your company is not already identified with this major project as an exhibitor . . . make sure it will be! Write, wire or phone your space requirements NOW while assignments are being made.

Direct your inquiries to: Benjamin T. Franklin, General Manager, NATIONAL AIRCRAFT SHOW, 1431 Chestnut Street, Philadelphia 2, Pa. Telephone: LOcust 8-1930.

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TRANSPORT TRENDS

Washington, D. C., July 4, 1955.

IN ALMOST UNPRECEDENTED IRONIC COINCIDENCE, the Senate has passed and sent to the House an expanded Federal Airport Aid program that was opposed by the Administration but later was found to parallel recommendations of the President's Commission on Intergovernmental Relations.

The legislation boosts annual airport aid to $63 million on the recent 50-50 cost-sharing basis; authorizes the Secretary of Commerce to contract for aid on a four-year basis; prohibits restrictions as to catagories of airports eligible for aid, and gives states two years instead of one in which to obligate their aid funds.

The Commission recommended that aid be continued on the 50-50 basis; the Act be clarified as to eligibility of smaller and larger airports for assistance; adequacy of federal appropriations be re-evaluated, and that appropriation periods for aid be lengthened at least two years.

MUNICIPALITIES DO NOT HAVE THE POWER to establish their own flying regulations, a U. S. District Judge has ruled in a decision that may affect every airport in the country.

Judge Walter Bruchhausen issued an injunction against the village of Cedarhurst, Long Island—which lies at the end of one of the runways of Idlewild International Airport—nullifying a municipal law making it a misdemeanor to fly lower than 1,000 feet over the area.

The ancient doctrine that he who owns the land owns the air above it no longer is valid, the judge ruled, because airspace now is part of the public domain.

Major airlines using Idlewild joined CAB and the Port of New York Authority in seeking a permanent injunction against enforcement of the Cedarhurst law. U. S. Attorney Leonard Moore said the ruling will have a broad affect on every airport in the country.

FIRST COUNTRY TO REQUIRE use of Distance Measuring Equipment in regular transport operations is Australia. First routes on which DME will be used are Melbourne-Sydney, Hobart-Melbourne, Melbourne-Adelaide and Sydney-Brisbane. Entire Australian network calls for installation of 70 ground beacons.

NEW ERA OF GROWTH IN AIR TRAVEL will be ushered in by high-powered turbine engines, says Lockheed president Robert E. Gross. He compares this era in its historical importance with arrival of twin-engine planes in the 1930s and development of four-engine, pressurized transports in the postwar years.

Turbines satisfy three main requirements of another major step forward in air travel, contends Gross: (1) Sharply increased speed, (2) greater comfort and (3) reduced operating costs.

GREATER DEMAND FOR FIRST-CLASS SERVICE rather than coaches exists in New York-Florida traffic, especially in winter season, according to study made by Northeast Airlines. Northeast would like to get in on Florida traffic. Its president, George E. Gardner, believes "there is always a market for quality products."

THERE APPEARS TO BE GROWING INTEREST in possible use of British engines to power some future U. S.-built transports. C. R. Smith, president of American Airlines, and Robert E. Gross, president of Lockheed Aircraft Corp., are expected to look over the Bristol Proteus and Napier Eland when they go to England to consult with Rolls-Royce on the RB109 in connection with the Lockheed Electra turboprop. Meanwhile, it is reported Douglas Aircraft is interested in the Rolls-Royce Conway as an alternate to the J57 for its DC-8 jet transport.

Every pound of equipment weight saved is worth its weight in gold!

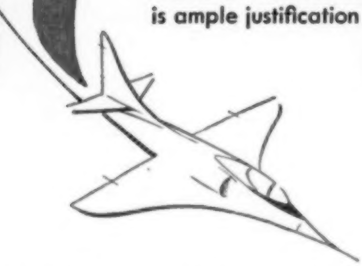
(THIS IS A FACT . . . THIS IS NO HYPERBOLE)

E. H. HEINEMANN
Chief Engineer, El Segundo Division
Douglas Aircraft Company, Inc.

"It is extremely important that designer, equipment manufacturers, and procuring agencies all have a clear understanding of the relationship between weight-saving and manufacturing costs. While the factor that relates cost to weight varies somewhat for different components and from one manufacturer to another, it has been found in recent years that on the average a pound of weight costs $50 to develop and produce. When this factor is combined with a typical weight growth factor of ten, *the cost of one pound of extra weight amounts to $500 per airplane if performance and strength are to be maintained.* From these figures it can be seen that there is ample justification for the expenditure of engineering time on all phases of a weight-saving program, no matter how small the individual saving may seem."

—E. H. HEINEMANN

at SAE National Aeronautic Meeting, Los Angeles



This growth factor discussed by Mr. Heinemann makes excess weight costly indeed. At $500 per pound, it literally costs its weight in gold. (Gold at $35 per troy ounce is worth $510.30 per avoirdupois pound.)

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Circle No. 28 on Reader Service Card.

BEA'S VISCOUNT: A $3-MILLION SUCCESS

By JOSEPH S. MURPHY

Viscount Operating and Traffic Statistics in Revenue Service

(April 1953 to May 1955)

OPERATING	
Average number of aircraft	17.1
Revenue hours flown	51,430
Average daily utilization (hrs.)	3.86
Number of flights	23,436
Aircraft miles flown	11,466,433
Average flight length (miles)	490
Average block speed (mph)	223
TRAFFIC	
Passengers carried	568,285
Passenger miles flown	342,802,746
Seat miles available	497,809,616
Passenger load factor	68.8%
Capacity ton-miles	58,231,923
Load ton-miles	38,924,658
Total revenue load factor	66.8%
FINANCIAL	
Revenue	$29,797,908
Expenditures	27,008,764
Net profit	2,789,144
DERIVATIVES	
Cost/flying hour	$525.56
Cost/aircraft mile	$2.36
Cost/capacity ton-mile	46.32¢
Cost/seat-mile	5.43¢
Revenue/flying hour	$579.88
Revenue/aircraft mile	$2.60
Revenue/capacity ton-mile	51.10¢
Revenue/seat-mile	5.99¢
Profit/flying hour	$54.32
Profit/aircraft mile	24¢
Profit/capacity ton-mile	4.78¢
Profit/seat-mile	0.56¢
Break-even load factor—Aircraft direct costs	34.5%
Break-even load factor—Total costs	60.4%

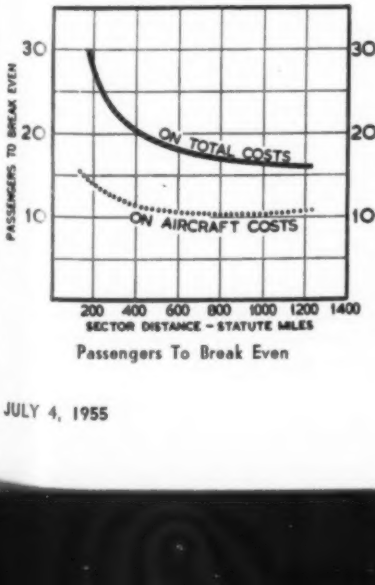
THE timing could not have been better. At least that's the way it must have looked from where officials of Capital Airlines were sitting.

For almost on the eve of Capital's inaugural Vickers Viscount service on the U. S. domestic airline scene, this country's airline officials were getting a first-hand preview of what to expect from the British-built turboprop. It came from none other than the most experienced of Viscount operators—British European Airways.

And what BEA's chief executive Peter Masefield had to say during the recent 5th Annual International Aeronautical Conference in Los Angeles could hardly be classed as good news to five major airlines faced with Viscount competition from Capital over its 5,100-mile system during the next year.

Here's what he reported on BEA's first two years of service with the turboprop:

- **A net profit** of nearly $3 million in flying 570,000 passengers some 343-million passenger miles since April 19, 1953. Earlier this year, BEA reported its first annual profit in history, a feat largely attributed to the success of the Viscount.
- **Gross earnings** of $30 million at an average load factor of 66.8% against total expenses of $27,008,764. Result is a profit at the rate of $54 per flying hour or 24 cents for every mile flown.
- **A "dramatic increase"** in the ratio of traffic carried by BEA competing against Douglas DC-6B and Convair aircraft operated by rival airlines. Between London and Geneva (487 miles) BEA's share of the total traffic jumped from 35% to 50% in the first year of Viscount operation. In London-Stockholm service it rose from 32% to 52%.



Passengers To Break Even

As to BEA reaction after 57,000 Viscount flying hours and over 225,000 Rolls-Royce Dart engine hours experienced to date, Masefield sums it up this simply: "We believe in the turboprop." This experience, he adds, "leads us clearly to the policy that we shall not buy any new major type of airplane with piston engines."

The BEA official further predicts that turboprops, in their developed form, can be used efficiently and economically up to speeds in excess of 460 mph, and for route sectors as short as 200 miles or as long as 4,000 miles.

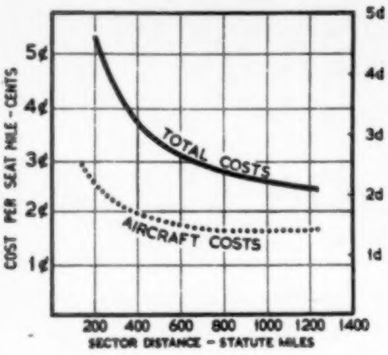
Viscount Statistics

As to the specifics of how the Viscount has performed, Masefield gave these details:

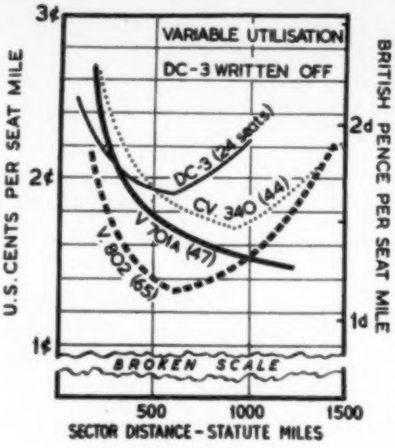
- **Operating Results**—In 25½ months of operation in airline service, BEA's average fleet of 17 Viscounts have flown 11.5 million aircraft miles, 343-million passenger miles, and 5.5-million ton miles of mail, express and freight. Over an average sector distance of 490 miles at a block speed of 223 mph, total operating costs have averaged $526 an hour or $2.36 per mile.

Revenue earned by the Viscount during this period amounts to $580 an hour or $2.60 per mile. These figures are based on European prices and operating conditions and, Masefield estimates, would be about 20% less in the U. S. under similar operational standards.

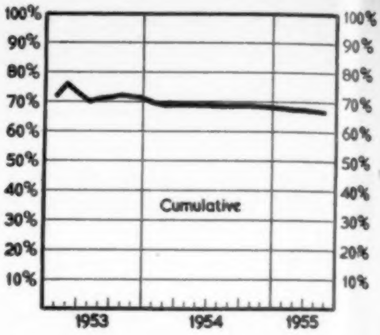
On this basis, the turboprop has thus far netted a profit of $2,789,100 at the rate of $54 a flying hour and 24¢ for every mile flown. Its break-even load factor to offset aircraft direct operating costs has averaged 34.5%, while



Seat Mile Costs



How Viscount Compares



Viscount Load Factor—The "novelty" doesn't wear off!

that for direct and indirect costs averaged 60.4%.

- **Actual load factors** experienced for the two-year span are a 68.8% passenger load factor and 66.8% on total revenue loads.

Here's how Viscount direct hourly cruising costs break down for 51,500 hours of revenue flying during the two years:

Flying Staff	$1,920,299
Stewards	314,681
Fuel and Oil	3,590,790
Engineering-Direct Labor	
Engines	34,544
Propellers	1,870
Airframe, etc.	1,413,219
Materials	
Engines	38,158
Propellers	......
Airframe, etc.	478,537
Outside Contracts	
Engines	1,608,351
Propellers	309,560
Airframe, etc.	575,383
Total Hourly Cruising Costs	$10,285,392

Total cost of Dart engine and Rotol propeller maintenance and overhaul on the Viscount, BEA records show, amounts to $38.80 a flying hour or only 13% of the total aircraft direct costs. And this figure has recently been substantially reduced, now that the "teething troubles" inevitable in any new aircraft have been successfully overcome, Masefield says.

The Dart Engine

BEA's experience with the Rolls-Royce Dart 505 engine in more than 250,000 hours of operation, he feels, offers great promise for the future. Between January 1953 and May 1955, only one propeller had to be feathered due to failure of engine components for every 4,550 engine hours flown.

This compares with one feathering for every 2,860 engine hours flown with the Bristol Centaurus piston engine, also a new powerplant by Dart standards in BEA service.

In all of BEA's operation, 137 Darts have been removed for "time" overhaul at an average of 618 hours during a period in which its overhaul time was being extended upward. In addition, there have been 142 premature removals for various causes, but these, Masefield says, are becoming progressively fewer.

BEA now operates the Darts to 1,050 hours between overhaul and replaces flame-tubes each 750 hours. Immediate target is to extend engine overhaul, including flame tubes, to at least 1,250 hours, with a longer-range aim of 2,000 hours for the entire cold part of the engine.

Viscount Economics

Viscount cost data for the first two years of operation (see charts) involves these variables which have been checked against results in service:

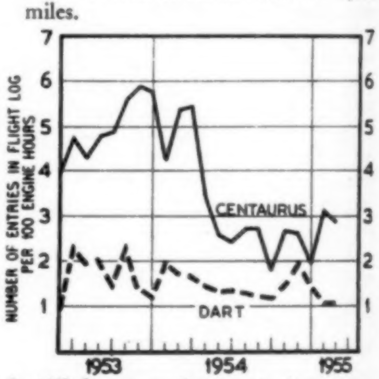
Payload—11,808 lbs. up to 950-mile sector; 9,858 at maximum 1,230-mile sector.

Block Speed—Varies from 139 mph at 100-mile sectors to 281 mph over 1,230 miles.

Utilization—4 hrs./day at 100 mile sector to 7.8 hrs. at 1,230 miles.

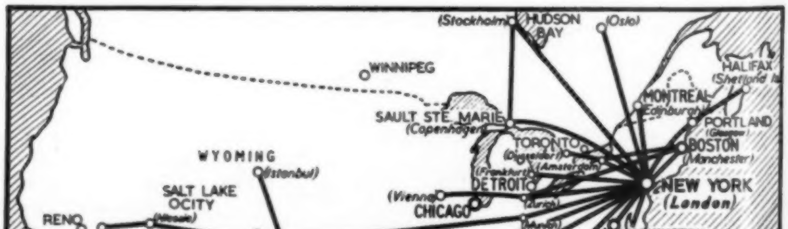
Revenue Rate—Varies from 87.0¢ per ton mile at 100 miles to 66.1¢ at 1,086 miles.

Cost Ratio—Ratio of total cost to direct aircraft operating costs varies from 2.2:1 at 100 miles to 1.4:1 at 1,230 miles.



Dart VS Centaurus—Fewer parts, fewer complaints.

Analysis shows that the most economic sector operation for BEA's current Viscount 701 on a seat-mile basis is 1,230 miles. Over this distance it can earn a $700,000 annual profit at a 65% load factor. Total cost of operating a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(Edinburgh)
PORTLAND
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(Copenhagen)
TORONTO
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(Palma)
DALLAS
(Malta)
ATLANTA
(Barcelona)
JACKSONVILLE
(Madrid)
EL PASO
(Benghazi)
SAN ANTONIO
(Tripoli)
MIAMI
(Gibraltar)
Average Sector Distance .... 230 miles

BEA in the USA. Map of U.S. with European and Middle East cities served by BEA Viscounts depicts extent of that airline's present turboprop operation.

Causes of Dart featherings in BEA operation

Cause	No.	Pct. of Total	Hrs. Per Feathering
Instruments/electrical	54	49	3,705
Reduction Gear	17	15	11,760
Fuel System	13	12	15,390
Miscellaneous Mechanical Items	11	10	18,200
Turbine blades/bearings	7	6	28,600
Accessories	5	4	40,000
Combustion System	4	4	50,000
Total	111	100	1,800

Viscount, including all overhead and interest on capital, is almost constant at $775,000 yearly in BEA service, regardless of sector distance.

• **Looking into the future,** Masefield contends that the Viscount-Major V.802 due to be introduced by BEA in 1956 will be ahead of any contemporary air plane in both passenger and airline appeal for sector distances ranging from 95 up to 1,086 miles.

Maximum sector distance for this model with full 12,826-pound payload will be 540 miles, whereas with reduced payload of 6,300 pounds it will be 1,430 miles.

This version will feature two quickly interchangeable cabin arrangements—a 65-passenger short-haul model with reduced catering and a 53-passenger layout with full catering for long-haul operations.

Piasecki To Build Commercial Transport 'Copter

Long-expected bid by Piasecki Helicopter Corp. for the civil transport helicopter market was launched this week as the company disclosed plans to build the Model PH-42, a 19-passenger commercial version of the military H-21 helicopter.

Proposed model, Piasecki officials said, is already being evaluated by New York Airways, Sabena Belgian Airlines, and other operators as a possible replacement for their present (primarily Sikorsky S-55) equipment.

NYA president Robert L. Cummings, Jr., confirmed that his personnel have flown the H-21 and says that a civil version "would offer several important advantages for intercity commuting service."

• **In anticipation** of airline orders, CAA certification of the H-21 is now under way, and Piasecki is quoting initial deliveries as early as 1956.

Although no official cost information was disclosed at this time, Don R. Berlin, Piasecki president, indicated earlier this year (AMERICAN AVIATION Jan. 17) that "the commercial price will be approximately $250,000 to $275,000 flyaway, depending upon the amount of equipment and furnishings such as radio, seats, soundproofing, etc. a customer would require."

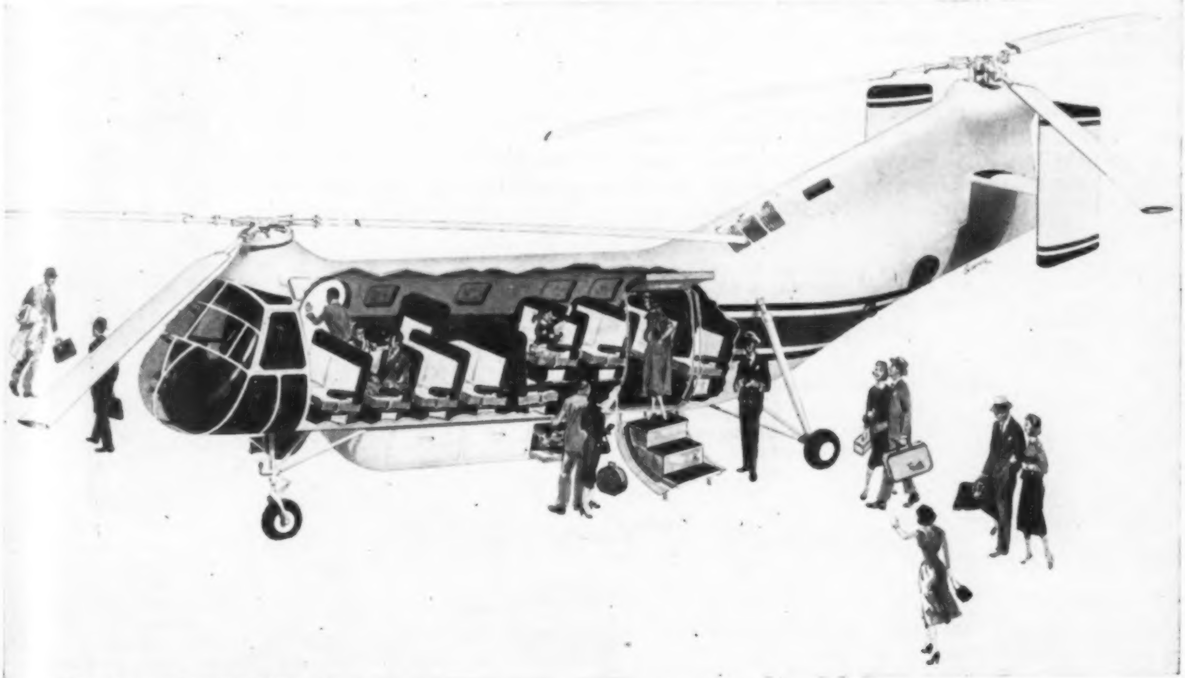
First specifications released this week show that the PH-42 will be powered by a Wright C9H-1 (R1820-103) engine having a takeoff rating of 1,425 hp. Gross weight will be 13,300 pounds and it will cruise at 98 mph for a best range of 338 miles.

An alternative cruise speed of 109 mph is available for short-range operations and top speed at sea level is pegged at 131 mph.

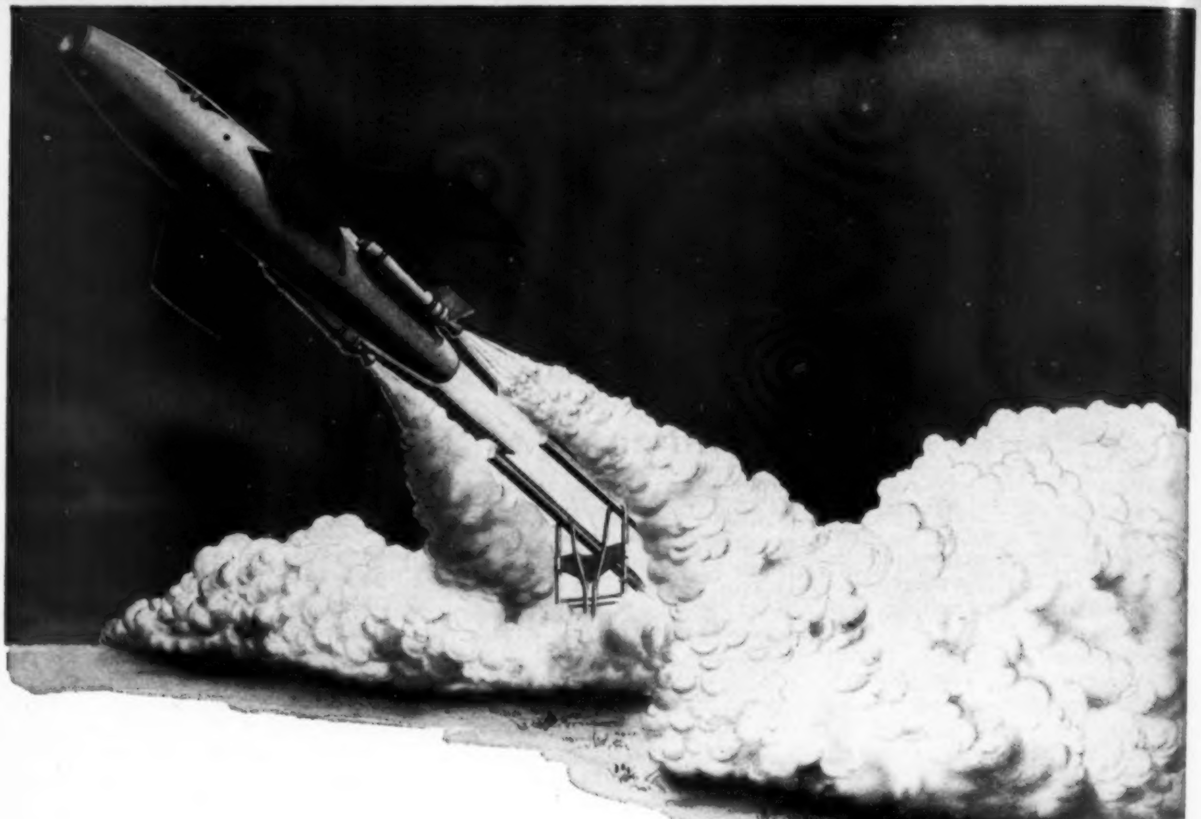
Passenger cabin, which measures 20 ft. long by almost six feet wide, is being offered in four layouts. Passenger designs call for either a 16-seat deluxe or 19-seat standard model. Other arrangements include a combination passenger-cargo or all cargo interior.

• **In addition,** Piasecki says, airline models can be fitted with an under-fuselage detachable "Helipack," making available added cabin space for passenger comfort. The "Helipack" can be used for mail or baggage, and would serve to speed heliport ramp operations as passengers could place luggage in the pack immediately before entering the cabin.

Another advantage cited for the PH-42 is the lack of need for any re-



ARTIST'S VERSION of proposed 19-passenger commercial configuration of military H-21 helicopter.



Two Aerojet-General high-thrust, short-duration solid propellant rocket powerplants boost the Navy's famed REGULUS missile off on its mission.

Built by Chance-Vought, the REGULUS is one of a growing number of available missiles for defensive or offensive applications.

This booster was tailor-made for REGULUS. Proven reliability, producibility and low cost make it another example of Aerojet-General's unparalleled experience in development and production of rocket powerplants.

Aerojet-General supplies liquid and solid propellant rocket powerplants, auxiliary power units, gas generators, or other associated equipment to a major part of America's missile program.

Since the first JATO was produced by Aerojet-General in 1942, the company has delivered over 350,000 JATOs and boosters ranging in thrust from 250 pounds to 100,000 pounds.

• Solid- and Liquid-Propellant Rocket Powerplants for Missile and Aircraft Applications • AeroBRAKE Thrust Reversers (SNECMA) • Auxiliary Power Units and Gas Generators • Electronics and Guidance • Ordnance Rockets • Explosive Ordnance and Warheads • Underwater Propulsion Devices • Architect-Engineer Services for Test Facilities

AEROJET-GENERAL NEEDS:

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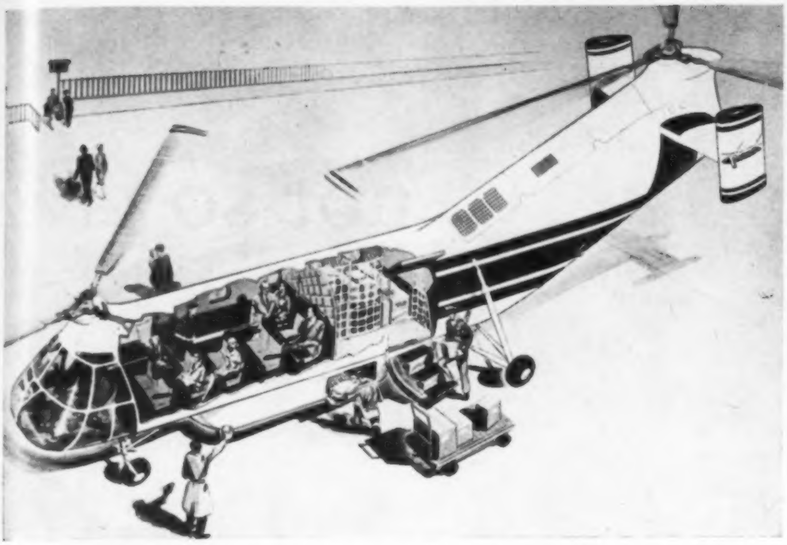

CARGO-PASSENGER version of PH-42 with "Helipack" container under fuselage.

stricted seating of passengers. Reason is that tandem-rotor design dispenses with special consideration for balance or center of gravity during loading operations.

To further enhance loading conditions, rotor-to-ground clearance of 14 feet permits ramp personnel to walk about the helicopter in complete safety with rotors turning. Ground vehicles can be driven alongside the helicopter to load or unload mail and cargo.

Beyond actual airline operation, Piasecki is also proposing the PH-42 for such industrial applications as mining, off-shore oil drilling, lumber and construction work. In this type of service, suggested uses of a passenger model would include hauling of work teams, surveyors and engineers into remote sites from which conventional aircraft are unable to operate.

- **Industrial cargo** models would include provisions for use as a "flying crane" in which loads up to 4,500 pounds could be carried on a sling suspended from the underside of the fuselage.

Piasecki price of about $250,000 for the PH-42 essentially represents the bare helicopter before fitting for airline or industrial use. Not included in this figure are special cabin equipment for cargo hauling, troop-type or passenger seats, "Helipack" containers, winches, heating, air conditioning and cargo slings. Communications and navigation equipment, automatic pilots, special instrumentation, and flotation gear for water and swamp operation are also classed as optional items. • • •

Piasecki PH-42 Specs

Performance	
High speed at sea level	131 mph
Cruise for best range (sea level)	98 mph
Maximum rate of climb	1,080 fpm
Service ceiling	9,450 ft.
Engine	Wright C9HD-1
Fuel consumption at cruise	69 gal./hr.
Range (with 300 gals.)	338 miles
Center of gravity range	41.5 in.
Capacity	
Gross weight	13,300 lbs.
Weight empty (passenger version)	8,730 lbs.
Passengers, baggage, fuel, oil & crew	4,570 lbs.
Seating capacity (crew)	2
Seating capacity (passengers)	19
Cabin cargo capacity	615 cu. ft.
Helipack capacity	80 cu. ft.
Dimensions	
Over-all length (rotors turning)	86' 4"
Fuselage length (blades folded)	52' 6"
Width (blades folded)	14' 4"
Over-all height	15' 5"
Rotor diameter (blade tip circle)	44' 0"
Passenger cabin length	20' 0"
Passenger cabin width	5' 8"
Passenger cabin height	5' 10"

CAB NEWS

Pending Cases

Another king-size CAB hearing on new air routes covering in general the Great Lakes to Florida area may be in the making. A rash of applications was touched off when the Board set a pre-hearing conference on a nine-year-old application of **Eastern Air Lines.**

The EAL application, known as the Washington-Chicago case (Docket 2396) and encompassing routes in that area, was filed in 1946. When a pre-hearing date was set, CAB received applications from **Capital, Delta-C&S, United, National, Lake Central, TWA, Northwest** and **Piedmont,** some of which covered routes from Miami on the south to Toronto on the north. All carriers asked to have their applications consolidated with the EAL case for hearing.

Recent Decisions

Pan American-Grace Airways, Braniff Airways and **Alaska Airlines** ordered to show cause why present temporary mail rates should not be further reduced.

Board ordered Panagra to show cause why temporary pay should not be cut from $2,290,000 yearly to $393,000 effective January 1, 1955.

Braniff show-cause order proposes that its Latin American annual payment be reduced from $1,774,000 to $1,139,000 also effective January 1.

Rate cut proposed by Board for Alaska Airlines involves a drop from $2,511,000 to $2,117,790 starting on the same date.

Pioneer Air Lines granted application for continued suspension of service by Continental Air Lines at Big Spring, Tex. and American Airlines at Big Spring and Abilene pending outcome of Pioneer Certificate Renewal Case.

Calendar

July 7—Argument, Large Irregular Air Carrier Investigation, Wash. D. C. Docket 5132 et al.

July 12—Hearing, 3c Mail-by-Air Rate Investigation. Tentative. Docket 6881.

THIS "NEW LOOK" on a Northwest Airlines 707 Stratocruiser is an X-band weather mapping radar antenna installed behind the special radome nose housing. It is the first commercial installation on a Stratocruiser, and will be evaluated together with a C-band unit installation in another aircraft.

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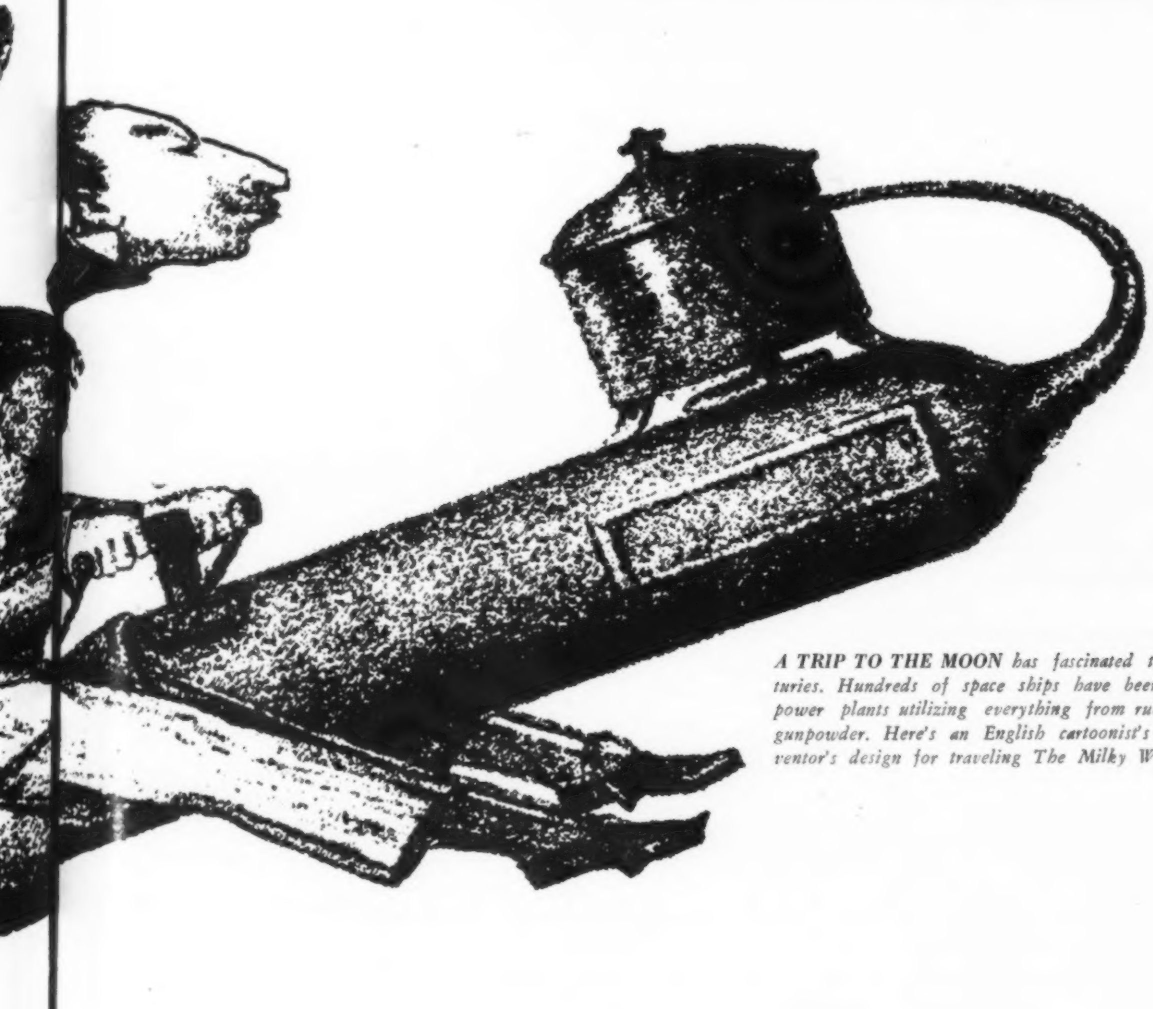

A TRIP TO THE MOON has fascinated the fly-boys for centuries. Hundreds of space ships have been conjured up, with power plants utilizing everything from rubber-band motors to gunpowder. Here's an English cartoonist's version of one inventor's design for traveling The Milky Way. The date—1825

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U. S. Domestic Airline Revenues, Expenses, Quarter Ending March 31, 1955

(Compiled by American Aviation Publications from Official CAB Data)

AIRLINES	TOTAL OPERATING REVENUES	PASSENGER REVENUES	MAIL REVENUES	EXPRESS REVENUES	FREIGHT REVENUES	FEDERAL SUBSIDY	NON-SCHEDULED TRANSPORT REV.	TOTAL OPERATING EXPENSES	AIRCRAFT OPERATING EXPENSES	GROUND & INDIRECT EXPENSES	NET OPERATING INCOME BEFORE INCOME TAXES
American	$ 55,327,027	$ 49,384,438	$ 1,035,955	$ 947,130	$ 3,171,729	$	$ 45,294	$ 49,999,118	$ 24,996,506	$ 25,002,612	$ 5,327,909
Braniff *	9,079,816	8,137,013	231,185	118,568	202,199	248,797	18,366	8,123,102	3,959,183	4,163,919	956,714
Capital	10,508,007	9,455,630	302,733	261,286	258,489	. . . .	117,920	11,503,923	5,366,733	6,137,190	-995,916
Caribair	385,286	343,423	4,642	. . . .	11,166	9,294	2,647	323,067	139,731	183,336	62,219
Colonial	1,645,942	1,453,658	27,619	8,981	32,628	97,662	2,906	1,766,825	726,041	1,040,784	-120,883
Continental	2,995,450	2,625,985	115,283	28,355	71,965	47,244	8,757	2,832,412	1,526,928	1,305,484	163,038
Delta-C&S	14,986,748	13,797,583	348,816	214,932	380,858	. . . .	27,347	13,122,960	7,257,362	5,865,598	1,863,788
Eastern	50,479,192	47,493,443	753,262	466,182	601,622	. . . .	22,864	40,660,175	24,416,927	16,243,248	9,819,017
Hawaiian	1,168,860	845,241	7,817	. . . .	150,841	79,708	69,124	1,265,044	545,859	719,185	-96,184
National	15,183,611	14,024,685	275,847	78,525	281,031	. . . .	-16,046	11,655,268	6,516,989	5,138,279	3,528,343
Northeast	1,898,014	1,250,015	25,343	18,805	36,198	535,495	1,414	2,178,933	994,829	1,184,104	-280,919
Northwest	9,437,853	8,160,374	364,358	215,364	394,301	. . . .	. . . .	10,047,111	5,064,398	4,982,713	-609,258
Trans-Pacific	472,692	361,637	2,566	388	15,336	51,186	36,673	467,886	193,192	274,694	4,806
TWA	31,793,363	27,987,040	1,299,118	663,610	1,196,235	. . . .	152,666	33,911,816	18,477,405	15,434,411	-2,118,453
United	46,621,963	41,980,474	695,751	1,028,185	1,943,753	. . . .	122,740	47,060,890	22,568,859	24,492,031	-438,927
Western	6,768,916	6,252,203	234,882	71,394	135,932	. . . .	6,515	6,238,785	3,201,544	3,037,241	530,131
TOTALS	258,752,740	233,552,842	5,725,177	4,121,705	8,884,283	1,069,386	619,187	241,157,315	125,952,486	115,204,829	17,595,425

* Braniff's figures do not include operations of local service route 106 operated by Braniff as result of Braniff-MCA merger.

U. S. International Airline Revenues, Expenses, Quarter Ending March 31, 1955

(Compiled by American Aviation Publications from Official CAB Data)

AIRLINES	TOTAL OPERATING REVENUES	PASSENGER REVENUES	U. S. MAIL REVENUES	FOREIGN MAIL REVENUES	EXPRESS REVENUES	FREIGHT REVENUES	FEDERAL SUBSIDY	NON-SCHEDULED TRANSPORT REV.	TOTAL OPERATING EXPENSES	AIRCRAFT OPERATING EXPENSES	GROUND & INDIRECT EXPENSES	NET OPERATING INCOME
American	$ 1,426,628	$ 1,222,231	$ 10,188	$ 28,152	$ 268	$ 112,090	$	$	$ 1,125,327	$ 497,921	$ 627,406	$ 301,301
Braniff	2,085,119	1,398,872	74,107	45,945	. . .	104,000	364,038	16,369	1,863,453	856,021	1,007,432	221,666
Colonial	320,185	287,449	2,066	2,009	. . .	5,081	12,928	. . . .	400,177	137,424	262,753	-79,992
Delta-C&S	1,081,498	971,659	11,513	3,311	. . .	57,527	. . . .	. . . .	1,141,735	596,600	545,135	-60,237
Eastern	2,302,469	2,091,643	91,192	. . .	. . .	51,118	. . . .	23,406	1,856,726	1,272,325	584,401	445,743
National	1,055,640	987,037	7,823	64	2,832	29,005	. . . .	. . . .	1,048,916	523,627	525,289	6,724
Northwest	4,542,745	2,482,265	1,025,929	165,846	11,366	592,326	185,471	. . . .	4,826,370	2,280,068	2,546,302	-283,625
Panagra	5,020,301	3,660,964	85,182	143,424	. . .	271,105	487,318	86,132	4,210,234	1,571,758	2,638,476	810,067
Pan American												
Latin Amer.	20,286,404	13,610,908	467,769	263,061	. . .	2,111,938	2,779,960	222,345	17,738,785	7,625,018	10,113,767	2,547,619
Atlantic	17,742,736	11,960,326	1,340,432	660,498	. . .	1,513,422	669,425	764,101	19,344,434	8,920,941	10,423,493	-1,601,698
Pacific	13,760,991	8,894,582	2,055,470	403,254	. . .	1,197,705	755,985	258,979	12,769,357	6,687,266	6,082,091	991,634
Alaska	1,349,613	688,168	36,587	. . .	. . .	247,955	337,690	25,825	1,584,634	744,180	840,454	-235,021
TWA *	10,519,892	7,399,741	1,039,314	648,464	. . .	902,388	. . . .	78,790	12,805,620	5,814,480	6,991,140	-2,285,728
United	2,271,550	2,130,021	34,170	. . .	. . .	55,757	. . . .	. . . .	1,915,572	976,181	939,391	355,978
TOTALS	83,765,771	57,785,866	6,281,742	2,364,028	14,466	7,251,417	5,592,815	1,475,947	82,631,340	38,503,810	44,127,530	1,134,431

* Mail pay subject to retroactive adjustment in pending mail rate case.

NOTE: Data in above tabulations were compiled by American Aviation Publications from reports filed by the airlines with the Civil Aeronautics Board. Figures for American Airlines include that carrier's service to Mexico but not to Canada; for Braniff to South America; Delta-C&S to South America; Colonial to Bermuda; Eastern to Puerto Rico; National to Havana; Northwest to Orient and Honolulu, and United to Honolulu. Operations of U.S. carriers into Canada are included in domestic reports to CAB, in accordance with CAB filing procedures.

Airlines Report Top Executives Salaries

The following carriers have filed with CAB Schedule E reports listing the 1954 salaries, other compensation, and stockholdings of officers and directors:

● **Alaska Airlines, Inc.**—Nelson David, pres., gen. mgr. and dir., $24,999.68 salary (up $1,041.68), $200 directors fee; Robert J. Norris, secy., treas. and dir. (entered office as secy. and treas. 4/10/54), $8,400 salary (up $7,350), $100 dir. fee; Homer W. Robinson, chm. of bd. and dir., no salary, $200 dir. fee; Ralph W. Starkey, vp, $11,200 salary (up $968); Donald L. Ingalls, asst. secy. and asst. treas., $7,800 salary (up $4,200); Juliana D. Wilson, asst. secy. and asst. treas. (entered office 4/10/54), no salary, $1,300 retainer as legal counsel in Alaska.

● **Continental Air Lines, Inc.**—Louis H. Mueller, chm., bd. of dir., no salary, $200 bonus and indirect compensation; Robert F. Six, pres. and dir., $35,000 salary, no bonus and indir.; Joseph A. Uhl, vp, treas. and dir., $17,000 salary (up $265), no bonus and indir.; C. C. West, Jr., vp and dir., $19,500 salary (up $250), no bonus and indir.; O. R. Haueter, vp operations, maint. and eng., $20,500 salary (up $375), no bonus and indir.; Lynn H. Dennis, vp, flight service, $11,500 salary (up $225), no bonus and indir.; Stanley O. Halberg, vp traffic and sales, $12,000 salary (up $225), no bonus and indir.; S. B. Redmond, secy., $11,000 salary (up $375), no bonus and indir.; George J. M. Kelly, asst, secy., $7,114 salary (up $1,286), no bonus and indir.

(Note: all entered office 4/26/54.)

● **Cordova Airlines, Inc.**—Merle K. Smith, pres., $12,000 salary; Raymond B. Coffin, secy. and treas., no salary; Bertha C. Smith, dir., $3,600 salary.

(Note: all entered office 9/27/54.)

● **Ozark Air Lines, Inc.**—B. T. Mattingly, chm., $9,375 salary (up $750), $460 bonus and indirect compensation; Laddie Hamilton, pres. and dir., $20,208 salary (up $2,958), $460 bonus and indir.; A. G. Hayne secy. and dir., $4,500 salary (up $1,050), $440 oonus and indir.; F. W. Jones, treas. and dir., $7,500 salary (up $600), $320 bonus and indir.; G. O. Shaver, pilot and dir., $10,998 salary (up $1,059), $300 bonus and indir.; A. A. Blumeyer, vp and dir., no salary, $240 bonus and indir.

● **Pan American World Airways, Inc.**—J. T. Trippe, pres. and dir., $20,000 salary, $2,350 directors fee; S. F. Pryor, vp, asst. to pres. and dir., $29,000 salary, $15,000 bonus and indirect compensation, $1,850 dir. fee; J. C. Leslie, vp and dir., $29,000 salary, $15,000 bonus and indir., $1,100 dir. fee; H. J. Friendly, vp, gen. counsel and dir., $29,000 salary, $15,000 bonus and indir., $800 dir. fee; Erwin Balluder, vp, $27,000 salary, $11,000 bonus and indir.; Franklin Gledhill, vp and dir., $28,000 salary, $14,000 bonus and indir., $1,200 dir. fee; H. M. Bixby, vp and dir., $14,000 salary, $5,000 bonus and indir., $2,250 dir. fee; A. P. Adams, vp, $26,000 salary, $11,000 bonus and indir.; R. B. Adams, vp, $21,000 salary, $6,000 bonus and indir.; W. G. Lipscomb, vp traffic and sales, $28,000 salary, $14,000 bonus and indir.; A. A. Priester, vp (entered office 6/8/54), $11,278 salary (up $2,834), $5,000 bonus and indir.; H. E. Gray, exec. vp AD, $28,000 salary, $14,000 bonus and indir.; W. L. Morrison, exec. vp LAD, $28,000 salary, $14,000 bonus and indir.; C. M. Young, exec. vp PAD, $25,000 salary, $9,000 bonus and indir.; H. W. Toomey, vp, $20,000 salary, $2,500 bonus and indir.; H. H. Berks, vp (entered office 6/8/54), $20,000 salary, $8,000 bonus and indir.; J. S. Woodbridge, comptroller, $22,000 salary, $9,000 bonus and indir.; R. G. Ferguson, treas., $22,000 salary, $9,000 bonus and indir.; H. P. Morris, secy. and gen. atty., $14,000 salary, $3,000 bonus and indir.; J. C. Cone, asst. vp, $16,000 salary, $5,000 bonus and indir.; W. J. McEvoy, asst. vp, $13,000 salary, $3,000 bonus and indir.; W. W. Lynch, asst. vp, $18,360 salary (up $7,702), $4,000 bonus and indir.; S. B. Kauffman, asst. vp, $17,000 salary (up $8,613), $4,000 bonus and indir.; E. M. Goulard, asst. vp (entered office 6/8/54), $8,458 salary, $2,500 bonus and indir.; J. E. McGuire, asst. comptroller (entered office 7/13/54), $5,600 salary, $1,000 bonus and indir.; Amos Hiatt, asst. comptroller (resigned 6/8/54), $4,828 salary (down $6,172), no bonus and indir.; R. P. Monson, asst. treas., $15,000 salary, $6,000 bonus and indir.; E. G. Rothrock, asst. secy., $11,280 salary (up $910), $1,000 bonus and indir.; J. J. Cantwell, asst. secy., $8,460 salary (up $300), $750 bonus and indir.; Josiah Macy, Jr., asst. secy., $12,400 salary (up $5,202), no bonus and indir.

● **Piedmont Aviation, Inc.**—T. H. Davis, pres., treas. and dir., $16,500 salary; R. D. Hager, vp traffic, asst. to pres. and dir., $11,520 salary; R. S. Northington, vp fixed base div. and dir., $8.050 salary (up $737.50); H. K. Saunders, vp operations, $14,300 salary (up $1,100); M. F. Fare, secy. and dir., $8,150 salary (up $837.50).

● **Pioneer Air Lines, Inc.** Robert J. Smith, pres. and dir., $15,000 salary; Harold B. Seifert, vp and dir., $14,400 salary (up $800); Harding L. Lawrence, vp and dir., $14,400 salary (up $1,200); Arthur F. White, secy. and treas., $5,950 salary (entered office 6/8/54); W. F. Long, chm. of bd., no salary.

● **Reeve Aleutian Airways, Inc.**—Robert C. Reeve, pres., $15,000 salary; Robert L. Hanson, vp, $10,800 salary; Margaret Rutledge, secy. and comptroller, $8,700 salary; Janice M. Reeve, treas, $9,000 salary.

● **Resort Airlines, Inc.**—Clinton Davidson, Jr., chm. of bd., no salary (down $10,000); Walter Sternberg, pres. and dir., $25,500 salary (up $4,500) (resigned 9/16/54); Harold L. Graham, pres., vp and dir., $15,000 salary (elected pres. 9/16/54), $3,000 bonus and indirect compensation; R. A. Miller, secy., treas. and dir., $12,000 salary; Clinton Davidson, vp and dir., no salary; Guy Tomberlin, vp, $4,230 salary (entered office 8/16/54 and resigned 12/16/54); Harry B. Taylor, asst. treas., $9,000 salary (up $1,125).

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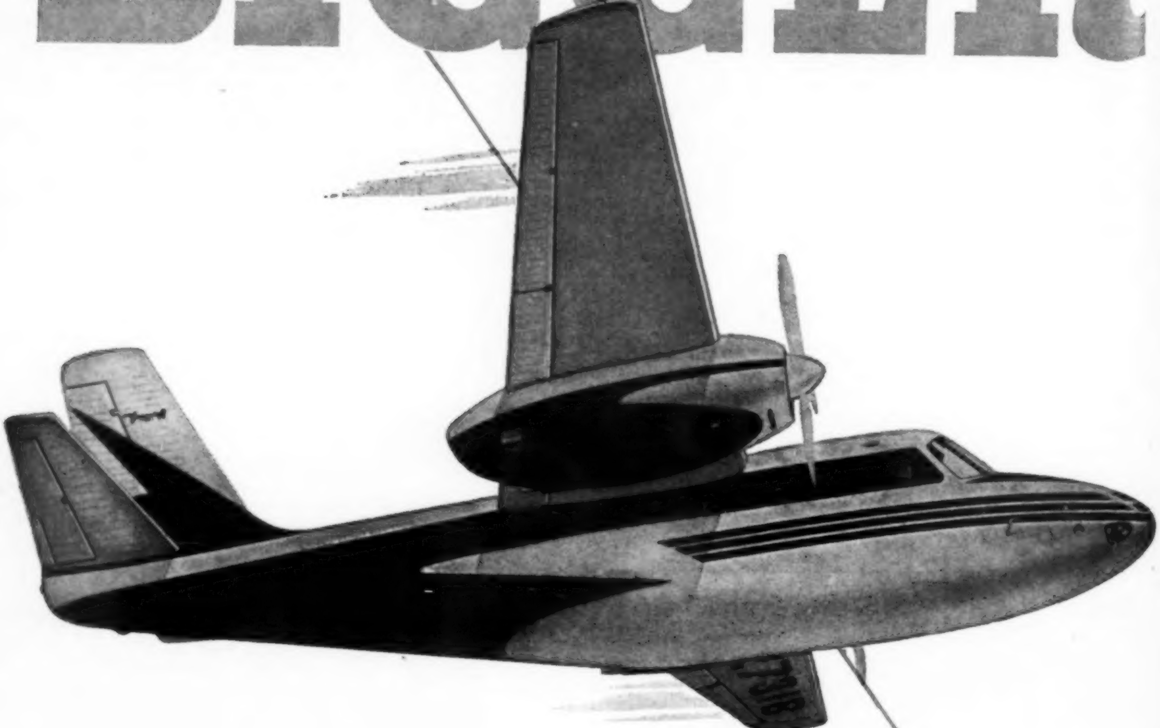

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Airline Commentary

By Eric Bramley

Which U. S. airline is the oldest? We're curious—even at the risk of stirring up an argument. Western Air Lines, marking its 29th anniversary, says in its houseorgan that it's the "nation's oldest continuously operated airline. Western, which first took to the skies in 1926, was one of the original airlines to win government contracts to carry mail and today is the only survivor of that pioneering group."

In passing, we see in the June issue of Official Airline Guide that WAL describes itself as "America's senior airline," a change from previous months when the description was "America's oldest flies America's finest." Now comes United Air Lines' houseorgan, headlining a 30th anniversary story, "United Established As Nation's Oldest Airline," and explaining why. And TWA this year is celebrating "30 years of service." So—what's the answer?

* *

We note with some amazement that the Senate Appropriations Committee wants a "complete investigation and report" of the "monopoly on taxicab transportation from the airport to points in Washington, which appears to be operated to the detriment of public convenience at exorbitant costs to passengers." We've had harsh things to say in the past about some limo operators, but Moe Lerner's Airport Transport in Washington wasn't one of them.

Without going into such items as how much the company pays the airport per year for the concession, our opinion is that the service is excellent, the safety record outstanding, limos new and clean, and prices reasonable. From this corner, it doesn't look like the Senators are on very firm ground.

* *

Odds and ends: Currently-listed New York-Los Angeles nonstop flight times: United and American, 7 hrs. 40 min. eastbound, 8:35 westbound, with DC-7s; TWA, 7:48 east, 9:09 west, with Super-G Connies . . . Joe Meyer, Delta-C&S general traffic manager, refers to item in June 6 issue commending Al Crowder, Northeast's Portland station manager, for using a full-length mirror to help in grooming agents, flight crews and other personnel. Joe says he used the same idea while with Chicago & Southern five years ago. We hereby give credit where it's due . . . Eighty-two of the world's airlines are now parties to Universal Air Travel Plan. Thirty-two of them are contractors (selling the plan) . . .

Sales, Traffic, Promotion

Capital Airlines will start scheduled Viscount service July 26, with three round-trips daily Washington-Chicago (two non-stop, one via Pittsburgh). A Washington-Norfolk round-trip will also be operated. Capital's schedules on these routes will be cut to "flying times unsurpassed by any other equipment now in commercial use," company says . . . Capital and **Lufthansa,** German airline, have signed an interline passenger-cargo agreement . . .

One of the biggest promotional tie-ins in airline history has been arranged by **Trans World Airlines** in connection with Walt Disney's Disneyland, which opens July 18 at Anaheim, Calif. A rocket space ship display (78 ft. long) carrying TWA markings and colorings will symbolize the "Tomorrow Land" section of the playground, and two spaceship theaters will take passengers on 20-minute simulated flights to the moon and back, via TWA.

Theaters' entrances will appear to be **TWA** ticket counters, crews on simulated flights will wear **TWA** uniforms, and souvenir **TWA** flight certificates will be distributed to passengers. Airline is reported to have a five-year deal with Disney at $50,000 a year . . .

Northwest Airlines has developed a "Waikiki Beach Bag," designed to hold "twice as much as a woman's purse," as a giveaway item for first-class overseas passengers . . . Nieman-Marcus store, Dallas, has been using **Trans-Texas Airways'** mailing lists in Brownwood, San Angelo, Hot Springs and Tyler, urging people to fly **TTA** to Dallas, spend the day shopping, and return home the same night . . .

American Airlines has completely overhauled its box lunch program for coach passengers. The old white cardboard container has been redesigned; cover of the new one is cellophane so the buyer can see the meal he's about to invest in. Inside the cover there's a built-in support to hold a cup of coffee or tea or glass of milk. **AA's** using six new basic menus; price of $1.25 is standard at all stations.

Company is also building a fleet of refrigerated carts, each of which can carry 78 lunches and hold them at 40 degrees until the moment of purchase by a passenger at the ramp . . .

Six Airlines Among Top 100 Advertisers

Six U.S. airlines were ranked among the top 100 national newspaper advertisers in 1954, according to American Newspaper Publishers Association's advertising bureau.

Eastern Air Lines was 22nd with expenditure of $2,819,776, a 49.7% increase over the $1,884,118 spent in 1953, when EAL was 45th. American Airlines, which upped its budget 104.4% from $1,043,985 in 1953 to $2,133,662 last year, jumped from 88th to 38th.

United Air Lines and TWA, unranked in 1953, placed 77th and 78th, respectively. UAL's $1,173,936 was up 58.3% over 1953's $741,659; TWA increased 88.4% from $619,376 to $1,167,061.

Pan American World Airways and Panagra combined placed 82nd with $1,130,703, up 5.6% over 1953's, $1,070,800 (86th). National Airlines, unranked in 1953, was 92nd, spending $1,003,189, a 10.2% gain over 1953's $910,519. Greyhound Corp. (45th) was the only other transportation company in the top 100, with expenditure of $1,746,260.

ANPA's compilation includes the following airlines:

Eastern Air Lines	$2,819,776
American Airlines	2,133,662
United Airlines	1,173,936
Trans World Airlines	1,167,061
National Airlines	1,003,189
Pan American World Airways	855,727
(PAA and Panagra also listed jointly for $8,279)	
Delta-C&S Airlines	671,975
Northwest Airlines	600,805
Capital Airlines	435,970
Braniff Airways	389,308
Western Airlines	329,535
British Overseas Airways	326,096
Air France	295,127
KLM Royal Dutch Airlines	285,695
Scandinavian Airlines System	264,111
Pan American-Grace Airways	205,510
SABENA Belgian Airlines	181,242
North American Airlines, Inc. (Agency)	162,259
Continental Airlines	160,591
Trans-Canada Airlines	147,536
Colonial Airlines	109,391
Allegheny Airlines	88,439
Piedmont Airlines	77,556
Resort Airlines	74,298
Pioneer Airlines	72,153
Swissair	69,047
Avianca	61,187
Northeast Airlines	57,142
Italian Airlines	55,884
Icelandic Airlines	40,069
Trans-Texas Airways	38,195
Pacific Northern Airlines	38,097
Skycoach Airlines	37,450
North Central Airlines	34,723
Canadian Pacific Airlines	7,112

the bulletin board

Undisplayed Advertising: $1.00 per line, minimum charge $4.00. Cash with order. Estimate 30 capital letters and spaces per line; 40 small lower-case letters and spaces per line. Add two lines if Box Number is included in lieu of advertiser's name and address.

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(Bulletin Board)

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SERVICE TO 6 CONTINENTS
AND AROUND-THE-WORLD

EN ROUTE . . .

WAYNE W. PARRISH

The Bentley Gets a Challenge from a Cadillac Owner

Well set me down right smack in the middle of Regent Street and cram my mouth with Yorkshire pudding, if an old friend of mine out in Indianapolis didn't blow a gasket when I wrote on this page some issues back that I wouldn't trade my 1950 Rolls Royce Bentley for the finest Cadillac built.

Yes siree, old man Roger Fleming, one of the best public relations gents ever to liven up the aircraft industry, was sitting in his office at General Motors' Allison Division and he just about had nuclear fits over my slight to the GM Cadillac.

Might as well print what he wrote me because ol' Rog can sling a fancy pen when he gets started:

"Dear Wayne:

Now you've gone too far!

For years I've endured the annoyance of Anglophile aviation writers who each year become ecstatic at the English hot rods of the air which make an annual appearance at Farnborough but somehow never get built in quantity to become useful tools for Her Majesty's aviators.

And I've suffered in silence when I've read glowing words about English aircraft engines which are either (a) types made obsolete in this country ten years ago and discarded in favor of models which meet U. S. aircraft performance standards; or (b) drawing board models which represent the Promised Land for aircraft performance.

But when you assert in print you'd rather have a 1950 Bentley than the "finest Cadillac" (En Route, April 11), I am deeply wounded not only in my native pride and the allegiance which holds me to the products built by the company which keeps martinis on my cocktail table—but my pride of ownership is stabbed.

Now Wayne, when you bought the damn thing to tour Spain I thought that was just fine. Just the car for my old buddy to go touring the European countryside looking for bidets, art treasures and quaint inns with delicious food and very dry martinis.

But not back in Washington, oh no! The Bentley club members (all 1212) may have their meetings at The Compasses at Pattiswick, near Coggeshall in Essex. But how about the 50,000 members of the 1955 Cadillac club who hold their meetings every Sunday on the open roads of America enjoying the really finest in passenger car transportation.

Now I am not sure what I can do about it. But if I can make the arrangements, will you agree to use a Cadillac for two weeks and see what the home folks are doing in passenger car driving?

And then why don't you come out and see some good American aircraft engines and we'll shoot the bull about the magic quality of the sea mists that enshrine the performance of everything that comes across the Atlantic.

Yours as a member of the Wayne Parrish fan club but a charter member of the I'd-rather-drop-dead-than-be-a-member-of-the-Bentley-Drivers-Club.

Sincerely,
/s/ Roger Fleming"

Well, sure 'nuf, that started things. So I wrote a brief note to Rog saying that before I took him up on any offer to drive a Cadillac for two weeks, would he just tell me one single thing. Had he ever driven, or been driven in, either a Rolls or a Bentley. That was a sly one, all right. Sure enough, he wrote back saying he hadn't.

So there we are. At the moment I'm holding out for a better offer than a two weeks' loan of a Cadillac. I'll let you know how the cold war progresses. Frankly I don't see how Cadillac could expect me to make a fair comparison for anything under a full year's trial, do you? Meantime, dadgummit, I like my Bentley and I can weave in and out of traffic on Connecticut Avenue better than any dadgummed Cadillac made in the past twenty years. It's a magnificent car (and I ain't about to dispose of it).

Besides, doesn't just about everybody own those Cadillacs, anyway?

Germany Next

Next issue I'll begin telling you about my recent visit to Germany on the new German airline, Lufthansa, including a tour of the Russian sector of Berlin, watching some virtually naked Germanic ladies wrestling in mud, and lots of other cultural and inspirational items.

In the meantime I am pleased to report that I've visited eight more U. S. airports served by airlines and now I have only 110 to go before I complete the system. On my way to the SAE meeting at Atlantic City, where I was chairman of an evening session on air transport progress, I hit Dover, Delaware, on Allegheny Airlines. I'm happy to say that I've now hit every state capital in the U. S. by air. Capt. Bob Bodhoidt and 1st Officer Henry Nash gave me a fine flight.

Returning to Washington on Allegheny I finally managed to stop at Easton/Cambridge, Maryland. So now I have hit every airport served by an airline in seven states.

At Atlantic City I stayed at the Chalfonte-Haddon Hall, a first class hotel which is part of the Distinguished Hotel group. Some time ago I complained about the lack of shelves for toilet kits in hotel bathrooms so Joseph McDonnell, manager of the Chalfonte, had a sign painted and hanging on the shelf in my bathroom. It read "Reserved for Wayne Parrish's toilet kit." Nice to know the hotel business retains a sense of humor.

It took two overnight stops and almost two days en route from Washington to Los Angeles, but I managed to hit six more local airline stops lately. Four of these were on Central Airlines between Little Rock and Fort Worth, but I'll have to tell you about that trip in a separate article because Keith Kahle, Central's peripatetic president, arranged a flock of ceremonies at which I was made honorary citizen of a number of communities and at one I was even named an Arkansas Traveler.

The other two stops—Blythe and Indio, California—were on Bonanza. I had taken a 6 p.m. American flight from Fort Worth to Phoenix. Bill Kerrigan, Bonanza's director of public relations (a capable old-timer in aviation) and Bruce Ryan, Arizona sales manager, met me and escorted me to the Sky Riders Hotel within walking distance of the fine Phoenix terminal. For my money the Sky Riders, managed by Gerald Weber, is the finest airport hotel in the world, bar none. It's modern, attractive, and the rooms are excellent. Try it out.

I had to get up at dawn to take Bonanza's #45 at 6:15 a.m. but it was a beautiful sun-drenched morning in the desert country and a fine flight with Capt. Bob Schafranka, 1st Officer Jack Huffman and Stewardess Mae Salisbury. Kerrigan and Ryan were on board, too. At Blythe I was presented with a magnificent Crenshaw melon (which I ate at the Hollywood Roosevelt after arrival), a souvenir package of cotton grown in the lush irrigated Palo Verde valley (along the Colorado River), and at Indio, served through Thermal Airport, I received a package of dates grown in that area. Thermal is 120 feet below sea level, the only such airport served by airlines in the U. S.

Tear Where?

On a slightly different subject, I've been noticing the increased use of Pream, a powdered cream which takes the place of regular cream, when being served coffee on some airlines. The powdered stuff comes in a small aluminum foil package and the instructions read "tear across here." Like a lot of instructions on modern packaging, the directions aren't specific. "Here" could mean up and down or across. I've tried to open a bunch of these packets and not one opened easily and successfully. When are manufacturers going to be explicit in directions and make things really easy to open?

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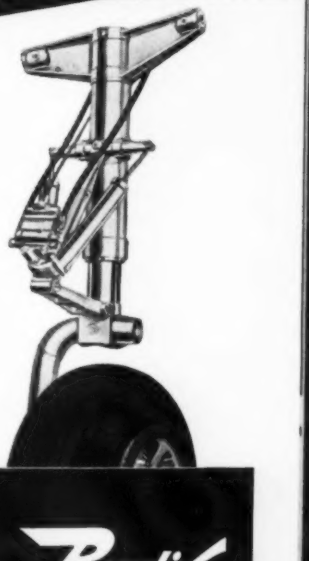

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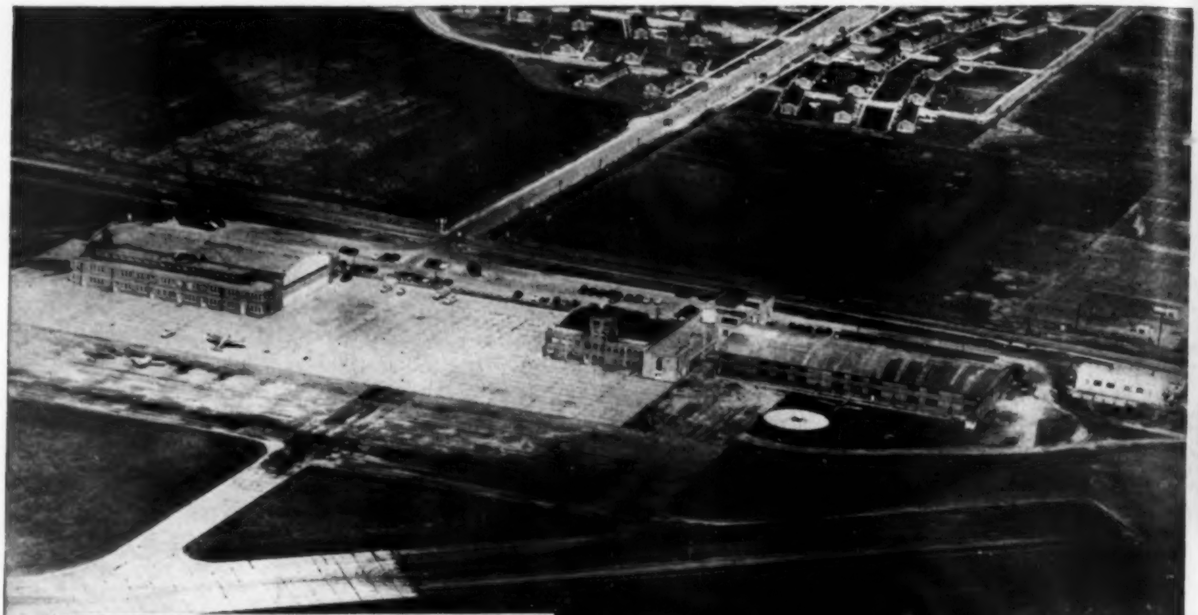

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